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FOREWORD

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AMERICAN SOCIETY OF CIVIL ENGINEERS

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TRANSACTIONS

Paper No. 3184

METHODS OF ACCOMPLISHING PROFESSIONAL DEVELOPMENT[a]

By Nathan W. Dougherty,[1] Hon. M. ASCE

SYNOPSIS

A professional is one who uses specialized knowledge and skill in the solution of problems that cannot be standardized. He is actuated by a service motive; he works in a relation of confidence, and observes an acceptable code of ethical conduct.

These qualities are acquired in the home, at school, and on the job in industry. To grow, the atmosphere and climate must be professional; the teacher and supervisor must be professional and interested in the growth of the student and worker. Formal instruction is desirable both in school and in industry.

Professionalism is a way of thinking and living rather than an accumulation of knowledge and power. Knowledge and power are essential and when actuated by the professional spirit they produce the leaders and torchbearers.

INTRODUCTION

The word professional has been bandied about with many meanings in our generation. To the AAU it means an athlete who uses his knowledge and skill for personal gain; to the college football coach it means the members of the opponent's team; to the public at large it may mean any one with enough skill in his activity to receive money for doing it. The range may be from the barber to the physician, or from the saxophone player to the leader of the orches-

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[a] Presented at the May 1959 ASCE Convention in Cleveland, Ohio.

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tra. For the purposes of this paper, the meaning will be restricted to a more specialized group identified by distinguishing characteristics that separate its members from all non-professionals.

After much travail, many mistakes, and a longing "for service to the people," three professions came into the last century bearing the title of "learned professions." They were law, medicine, and the ministry, and after a fashion, they deserved to be called learned. Many of the practitioners of each group had made formal study of the principles involved in their work, in colleges and universities. Other groups, as they developed formal educational preparation for their activity, were admitted to the learned groups. There was no formal initiation, no formal presentation with a charter, but rather an assumption of status by the group itself. Usually the doubters about professional status belonged to the group, and they were the most difficult to convince of all. Usually, the public takes a group at its own estimate of itself.

A PROFESSIONAL

Professional titles[2] should be limited to those persons who apply a body of specialized knowledge and skill, usually acquired by formal college education, to the service of the people. They exercise discretion and judgment; they work in a relation of confidence; they observe an acceptable code of ethical conduct, and band themselves into groups for the improvement of their work. They have legal status and the present tendency is to use this status as the badge of professionalism.

The knowledge and skill is quite different from that of an artisan who can handle tools, equipment or operations; the knowledge is a series of principles that may be applied to many different problems, whereas the skill is the art or the procedures that have been proved by much doing. Certain professionals are always seeking new knowledge, new methods, and new devices that may promote the application of their methods to new problems. The neophite must spend many years in acquiring the needed knowledge to perform with requisite knowledge and skill.

"Service to the people" is a characteristic of all professionals. William E. Wickenden illustrated the meaning in his classic article "The Second Mile." His thesis was: "If one compel thee to go one mile, go with him twain." It represents the over and above service, the heaped up and running over, the voluntary mile. It demands enough work to get the job well done, no matter what the compensation.

Discretion and judgment also connote independent judgment and service. It is the choice of alternatives, the selection of methods, the determination of amounts. It is not routines that may be performed over and over again. It is the type of judgment that is the same for buyer and seller, labor and management, or government and citizen. It is determined by facts and principles and not by the expediency of the moment.

The relation of confidence is a key to professionalism. It is the relation of the doctor to his patient, the lawyer to his client, the minister to his parishioner and the engineer to his employer. Some have suggested that an engineer is not called upon to exercise this relation, and that he, therefore, lacks one

2 "Your Approaches to Professionalism," by N. W. Dougherty, published by Engrs. Council for Professional Development, 29-33 West 39th St., N.Y.

element of professionalism. On the contrary, he is in a relation of confidence to his employer, to the public, and to all who use his works. A city may depend upon the excellence of his water supply, the traveling public may depend upon his bridge, and the whole city, state, or nation on the purity of his products. He stands in for his employer; he is the guardian of the public health and public safety.

All professionals adhere to an acceptable code of ethical conduct. Because they must take actions in confidence, they must treat their patient, client, parishioner, or employer as they would treat themselves. Their responsibilities are such that they must assume this relation.

Usually professionals band themselves together to improve their knowledge, their methods of performance, and to learn new skills and procedures. They do not form pressure groups to get advantage for themselves, but rather they form groups in order that they may render "better service to the people."

MAY THESE THINGS BE TAUGHT?

The topic is accomplishing professional development. To describe a product or a personal quality and not be able to produce it or acquire it may be of little benefit. If a characteristic or a quality may be identified and described, it may be taught to all who will learn.

First and foremost, the teacher must be a professional. He must have all the characteristics in abundance. In the areas of the emotions, ethical conduct, service, and relation of confidence, much instruction is by contact and contagion. One morning the father of a youngster awoke to find the ground covered with snow. He started to the garage to get tools to clear the walk and looked back to see his young son following in his footsteps. The youngster said: "Daddy, I'm coming." That is the way most youngsters get much of their learning; they walk in the footsteps of the father and the teacher. This following of example continues all through their lives.

No teacher who is crabbed, a slave driver, or unsympathetic can teach the professional attitudes of life. He must be to his students what he would like them to be to their employers when they leave his classroom.

Some formal instruction is desirable. Teachers and educational administrators do not agree on the values of formal instruction. Surely anything that can be formulated may be taught, although in the items of professionalism the teacher must be careful that he does not develop a sanctimonious attitude rather than a living, full-blooded, vigorous presentation. Engineers are not alone in the recognition of this problem. Several years ago a study was conducted by lawyers of the conduct of judges and lawyers,[3] in which they investigated instruction in the development of professional standards and ethical procedures. Some teachers said that a knowledge of the rules of conduct does not necessarily make men moral, whereas others said that the schools have a duty to aid in the development of their students. The practice in teaching law, as in teaching engineering, is to run the gamut from a few lectures on professionalism to a formal course in ethics and professional practice. Again we say that the best teacher is one who practices what he teaches.

In engineering there is need for more printed material on the canons of engineering practice. Codes of ethics are available, but there is no literature of

[3] "Conduct of Judges and Lawyers," by Phillips and McCoy, Parker and Co., Los Angeles, Calif.

cases decided or practices recommended. In this field, the lawyers have not been afraid to go on record.

The psychologist tells us that there is little carry-over from one discipline to another, yet there must be an attitude of mind that approaches a series of problems in the same way. There are certain laws of nature that cannot be violated by a designer who wishes a safe and economical structure. Action is equal to reaction whether it be a machine, a structure, or a flowing stream. An engineer who habitually follows the laws of physics and mechanics should be habituated to follow other laws that he conceives to be right and just. Punishment for violation may not come as swiftly and as surely, but he will expect it to come. Here may be a lesson, that use of the scientific method has a tendency to condition a person for use and respect of moral and ethical laws. If there be a criticism of the point of view, it will come from the possibility of rigidity developed by closely following physical laws. Is it not the same kind of action and reaction as in mechanics when we say: "Cast thy bread upon the waters and in many days it will return unto thee," but it is action and reaction.

There are many things a teacher may do to promote a professional attitude in his students, but the most productive is the demand and expectation of excellence in their work. He should not be a slave driver or a charlatan, but a leader who does his own work well. Habitual performance of good work causes the student to accept Wickenden's doctrine of the second mile, and causes him to take sufficient care to do excellence. Slovenly work that is passable is not good enough when well done is possible.

INDUSTRY MUST HELP

Much information is available regarding working conditions in industry that promote worker satisfactions and professional attitudes. First and foremost, professional workers must have intelligent and understanding supervision. The supervisor of professionals must have a two-fold objective, first to get the work done, and second, to improve a worker for the organization. In the long run, the greatest asset of the company is its competent workers and their supervisory organization. Growth in stature of the professional workers adds to the assets of the company.

There is no longer a place for the "Bull of the Woods" type of supervision, rather, like a good teacher, he must be a leader and not a driver. He must know the work and be able to help beginners over the hard places.

Because professionals must develop independent thought and action, their working conditions must be suited to individual thought rather than to group activity. A working place where he can have quiet and a storage place in which he can keep his papers and books are minimum essentials. As his responsibility increases, his quarters will be improved to a private office with necessary furniture and equipment and ultimately a private secretary.

An item of great personal development is writing for publication; this improves the writer and brings good notice to the employer. In addition, the profession is benefited by its members having available new ideas and new methods. The atmosphere and climate of employment should be such that engineer employees are encouraged to attend professional meetings and to contribute to their programs. Engineers today build upon the shoulders of those who have gone before, and they currently aid their fellows by broadcasting solutions of problems generated by industry of today.

If a young professional has prospects of promotion he should be made aware of his possibilities. To work toward a stone wall or up a blind alley does not give a good outlook for his best work. If he is doing well his employer should tell him, if he is doing poorly his supervisor should tell him of his faults. An optimistic and satisfied employee grows faster into professional stature than one who is dissatisfied with his work.

A great stumbling block in the way of young engineers is the threat of unionism. Fortunately, it does not raise its head in the small organizations, but it is ever before the larger employer and his employees. A few thousand young engineers have gone into bargaining groups, but the vast majority of the more than 400,000 engineers in industry and the public service have not been convinced. Fortunately, engineering societies are outspoken in this matter, and if the climate is good in industry, the effort to organize engineers into bargaining groups will fall of its own lack of takers.

The lawyers are outspoken:[3]

> Since joining a labor union is in its infancy, it is suggested that a Canon covering the propriety of a lawyer joining a union might be adopted at the present time . . . The approach by labor union to a question of remuneration is based on the principle that a man is entitled to be paid according to his needs, rather than according to what he produced or the value of his service . . .
>
> Although few lawyers have joined labor unions up to this time, is it not important to take some steps to prevent what might develop into a seriour detriment of the profession?

Certain engineers have made equally strong statements. To allow young engineers to seek group action for their economic betterment is to show lack of foresight by older engineers and certainly to show lack of managerial abilities in industry.

Training programs in industry offer excellent opportunities for management to give orientation on company policies, to teach special knowledge and skill essential to the industry, and to give instruction and practice in professional attitudes and ideals. A person in training has not reached a fixed status and he should not be eligible to join permanent groups. During this period he should be continued in his professional concepts from college and he should graduate into a position that will ultimately lead to responsibility. With adequate knowledge of the company, with sufficient knowledge and skill to perform his job assignment, and a professional atmosphere and climate, the beginning engineer should grow into a budding professional.

CONCLUSIONS

Professionalism is a way of thinking and living rather than an accumulation of knowledge and power. Knowledge and power are exceedingly important, but professionalism has to do with their use; it should not be identified with them.

Socrates said: "If one knows what is right, he will do it." We have drifted far from this belief, yet it is the motto of the professional. His responsibilities will allow him to do no other. He is the descendent of the nobleman of the Middle Ages who accepted "noblesse oblige" as the obligation of honorable and gen-

erous behavior that was associated with high rank or birth. The professional must walk in the footsteps of the nobleman and torchbearer.

Lawrence Hawkins in "Adventures into the Unknown" has caught the idea as he writes about Willis R. Whitney, "Dean of Industrial Research:"

> To list what he accomplished would take time and space, but it would not be hard. The difficulty is to depict the man himself. For pervading, unifying, and illuminating his other qualities--his friendliness, his mental vigor, his breadth of interest and knowledge, his stimulating originality, his delightful flashes of humor, his modesty, courage, directness and simplicity--is an indefinable charm which defies portraiture but which is felt at the instant of meeting him and which is increased and strengthened through the years of close association.

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EDUCATION AND THE PROFESSION

ANNUAL ADDRESS AT THE CONVENTION
PHOENIX, ARIZONA, APRIL 12, 1961

By Glenn W. Holcomb,[1] President, ASCE

BACK TO HISTORY

Despite the fact that the formal profession of civil engineering is more than 100 years old, it is youthful in heart and spirit. The profession may always point to the work of man in ancient times with justifiable pride, since in the ancient structures much of the history of man is written. History records that it took 200,000 men 20 years to build the Great Pyramid. It is classified today as an engineering structure. Yet, by today's standards, it would have to be called the work of labor. We are well aware of the magnificent buildings of Grecian and Roman times. These are works of both art and engineering skill which can hardly be equalled today for sheer beauty and form. The arch bridges and aqueducts built by the Romans show positive indication of the ability to plan and design structures to meet the theoretical requirements of structural geometry and the laws of fluid mechanics. Yet even today, there are many differences of opinion on the methods of construction used by the builders when viewed in the light of power and construction equipment available at the time and we marvel at man's ability to build them.

For several centuries, civilization then passed through a period of relatively little advance in learning which added materially to man's well being and comfort; this was called, by historians, "The Dark Ages." In this period of history, however, science was sprouting deep roots. True, the men of science of this time worked for the most part in semi-secrecy, yet scientific facts were gradually being compiled and recorded by men of the civilized world.

Engineering was finally recognized as a program of study which could be put to use by applying the learned facts to improve the comfort and prosperity of the peoples of the world. The Ecole Polytechnic Institute of Paris, France, was first named as an engineering school in 1724. Other similar schools recognized the value of applying scientific principles to benefit mankind, and therefore, following the Ecole, introduced the principles of engineering practice into their courses of study. As history is measured, this is not very long ago.

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In the United States, the first named engineering school was Renselaer which announced an engineering curriculum in 1824. By 1860, there were seven institutions with curricula designated as engineering. Yet today (1961), barely 100 years later, by our present engineering standards, we would hardly recognize any of them as engineering curricula by their course content if they were not so named.

In this young country of ours, men who were building bridges for the new transportation facility pulled by the "Iron Horse," the aqueducts to bring water to the larger cities, and canals, found a common interest in their service to the people. They found a new use for some of the abstract principles of science and mathematics which had been stored away in the past. The theories and concepts of science began to show up in engineering work through applied use. It was natural that these few men in exchanging ideas about the peculiarities of their work should find a common bond and interest in their service and as a result, the American Society of Civil Engineers was born in 1852. Here then was the start of the engineering profession in the United States slightly more than a mere 100 years ago. This also represents the period in which engineering education began to be recognized by the educational institutions of the United States. The 1862 Congress called attention to and supported technical education by passing an act giving to the several states lands for the benefit of "instruction in the arts and sciences relating to agriculture and the mechanic arts." With the close of the Civil War, many engineering schools were instituted by this, the Morrill Act. This was both a timely and successful act for it resulted in the establishment of 64 technical colleges of which 50 schools offered courses in engineering. Perhaps the best way to show that engineering is really a youth in heart is to quote from a report of the New York Lyceum of Natural History to the City Council in 1831, which attributed the high mineral content of New York well water to contamination from grave yards and privies. These men of science also stated that "the absorption of large quantities of urine prevented the water from being even worse. . ." Although the fastidious may revolt from the use of water thus sweetened to our palate, it is perhaps fortunate that this mixture is daily taking place. . ." They also added that many New Yorkers had become so accustomed to the taste of this water that spring water was entirely unpalatable to them. Actually, the solids content of Manhattan water was about 2137 ppm, over twice that allowed today.

Boston developed a water debate about this time when minute organisms were first recognized in the water. Nathan Hale of Boston advised the citizens to close their eyes to the organisms unless they became too conspicuous.

The book, "The Quest for Pure Water," by M. N. Baker will forcefully bring one to a realization of where the engineering profession stood 100 years ago in the field of public health engineering. The problems of the larger cities were just beginning to be realized but not understood. The standards required were shocking when compared to those of today. Problems of solution were unknown and, of course, there was no known method of proving to governing bodies of cities that a solution might be found. Research was also just beginning to take root as something to be organized and supported by the public in the United States:

> In 1887, The Massachusetts State Board of Health established an experiment station at Lawrence to study filters. The growing recognition that diseases were carried in the water supply caused public demand for improved supplies of pure water. Typhoid fever was recognized as a

separate disease in 1850. The Boston Board of Health first started to list typhoid as a cause of death in 1856, however, in most cities listings were not made until the 1870's or 80's. Typhoid was recognized as a bacteria in 1880, but before this time it was suspected because of the close relationship between polluted water and the disease.

Thus we see here a good example of the delay between knowledge and practical application. At the present time, one good example familiar to all is fluoridation. In a pamphlet "The Dangers from Domestic Use of Polluted Water" published in 1883, Dr. Morton Prince of Boston stated:

> "The diseases which may be conveyed by water are many. The most common are typhoid, diarrhea and numerous smaller ailments. The most typical of this class is typhoid fever. This is probably, and especially in smaller towns, conveyed more frequently by poisoned water than in any other way." Many examples of typhoid epidemics may be enumerated for this period. In Plymouth, Penns., in the spring of 1885 in 8,000 population, 1,000 contracted typhoid and 114 died. The source of infection of the stream was a house many miles from the town on a swift flowing stream. From about 1890 to 1910, the death rate of typhoid was cut from 100 per 100,000 population to 15. Since that time the rate has been reduced to practically 0. In 1891, Chicago had 2,000 deaths from typhoid, a rate of 173; it was reduced to 20 in 1900.

I have used the presently called sanitary engineering division of Civil Engineering to illustrate where we were in technical progress less than a century ago. Almost parallel comparisons can be made for the other technical specialties recognized at the time. In structures and construction, equally vivid illustrations may be called to mind. In construction we did not have the heavy equipment for earth moving. Horse power in the flesh was the only power other than manpower. Consequently, roads went over or around the hills -- not through them. This was true for highway construction as late as 1925. The fourteen technical divisions of ASCE could each give equivalent and startling examples of the progress that has been made over the past years. Thus a short review of happenings in our technical advancement brings us to the conclusion that we have moved forward at an accelerated rate in the acquisition of knowledge in our field of civil engineering during each decade.

OUR EDUCATIONAL UNREST

Gradually, since World War II, with the explosion of science and a multitude of new discoveries or inventions, with the problems of defense, and the need for research in the areas of the space age, new ideas and changes in the educational procedure seemed necessary. Or has the idea prevailed that change is necessary to show advancement? Engineering education has been passing through a change the past 5 years as a result of a report by a committee of the American Society of Engineering Education entitled "An Evaluation of Engineering Education," published in 1954, which recommended substantial changes in curricula content for the engineering schools of America. The recommendations of this report were and are used by the Accreditation Committees of ECPD as a guide in their inspections of engineering schools requesting accreditation. With the insistence and pressure of ECPD has come quite a meas-

urable resistance from civil engineering departments and civil engineers in practice who questioned the advisability of taking so extreme a step in revising curricula as recommended by ECPD.

An ASCE Task Committee on civil engineering education followed by an Opinion Research Council report did not, in final analysis, bring a satisfactory answer. Finally, through the efforts of The Cooper Union, which acted as central agent supported by ASCE, there was obtained a grant from NSF of $40,000 to finance a Conference on Civil Engineering Education at Ann Arbor, Michigan. The conference was carefully planned by a selected group of educators, practicing engineers, and representative from industry. These men carefully planned a program of two and one half days to give time for prepared talks on the subject of civil engineering education. The last half day was to be devoted to presentation of resolutions aimed at resolving the trend civil engineering curricula were to pursue in order to best prepare a young man for his future as a practicing civil engineer. The Conference finally closed without an answer to the objective for which it was planned. There was honest confusion and misunderstanding at the meeting caused by lack of time to review and analyze all of the reports which were presented but, at the same time, the feeling by all of an urgent need to resolve the direction to take in education programs for our civil engineers for the future.

This may well be the most important step which the civil engineering profession will take this year. The final decision will shape the status and prestige of the civil engineering profession for at least a generation or more. In order to arrive at a decision, if possible, the Civil Engineering Education Committee has been assigned the task of assembling the papers of the Ann Arbor Conference and preparing ballots to canvass all of the education institutions attending the conference. To assist the CEE committee, there has been appointed to this committee, to act as an advisor, one civil engineer member from each of the former committees which have studied this field. These are the 1954 Evaluation of Engineering Education, the ASCE Task Committee of 1957, a member of the ASEE Civil Engineering Division of the ECPD Education and Accreditation Committee, and a member of the Planning Committee of the Ann Arbor Conference on Civil Engineering.

The CEE committee, with the advisors from the committees named which have had a part in recommending programs of education standards and criteria, is charged with the duty of preparing a ballot for canvassing all of the engineering schools in attendance at the conference to determine the trend engineering curricula should take in the immediate future. Two ballots will go to each school: one to the official representative and one to the Civil Engineering Department. The ballots will be accompanied by a volume containing all of the papers of the Ann Arbor Conference. The ballots are ready for circulation at this time. It is expected that each institution will make a most careful appraisal of the ballot as well as the accompanying papers before the ballots are returned, because the decision of the ballot may very well have a lasting effect on the prestige of civil engineering as a profession.

Now it seems necessary to review in some detail how the controversy on civil engineering education rose to the present high pitch. The 1954 Evaluation of Engineering Education Committee of the American Society for Engineering Education included all engineering, and perhaps misunderstanding or misinterpretation by some caused the lack of support by many in civil engineering professional practice.

The report was comprehensive and profound in its conclusions and recommendations. It called for increased hours in the fields of science and mathematics, the basic subjects of our engineering profession, and, at the same time, a stepping-up of content of the course. This, of course, points to a need for a more rigorous and intensive course of study at the secondary school level. The name "engineering science" has been assigned to a series of old courses which were used to relate science to engineering. The new "engineering science" included those formerly described as "strength of materials," "fluid mechanics," "dynamics," and similar names in the other fields of engineering. The increase in the required credits in these courses requires some radical change of subject matter for most schools of engineering since some of the requirements call for many credits not specifically related to the civil engineering field. The stated aim of the new curriculum was to give a more general training in all fields of subject matter.

Since this is a curriculum which requires the student in a 4-year curriculum to be ready for calculus at the time he starts in the engineering school, it will probably mean a decrease in engineering students because the ability to master the advanced sciences may be lacking. Those institutions, especially the private ones, with very selective entrance requirements will not be particularly affected since they are only enrolling students of near-genius ability who are capable of mastering mathematics beyond the calculus and the advanced science so necessary in the research area of our profession today.

No one may quarrel with the aims of the report in that the curriculum proposed would prepare a man with high intellectual ability for advanced academic work at the graduate level if he so desired. I believe it forgot the 80% to 85% of the present engineering enrollment who, while not of genius ability, do have the capacity to perform those professional jobs which so many of our professional engineers do today. The question which we must answer in the near future is: Do we want to have the engineering profession of the future years composed of fewer members than in the past? Bear in mind that not over 20% of the present graduating classes do make the grades which are required for graduate study.

The proposed curriculum will cause a high mortality rate in schools which do not have very selective entrance requirements, of which there are relatively few, unless considerable watering down of subject matter content occurs in the science and mathematics courses prescribed. The only thing to save the high mortality will be to materially increase the entrance requirements which again will lower engineering enrollment.

This points to the fact that in our learning process, whether we are training for science, engineering, or literature, each particular individual can only absorb learning according to his natural ability, initiative, industriousness and those other qualities which make up the individual.

Engineering education and the profession of civil engineering must appraise the profession of the future in the eyes of the past and present. We have in the past had men who were in the top 20% of the graduating classes, who contributed to the advance of knowledge in the sciences, who brought about improvements in industry and who made significant discoveries. But we must also remember that in the past history of mankind there have often been great accomplishments by men of apparent non-scientific minds, but with very practical minds. There have even in the past been many things accomplished which the theoretical and scientific minds said could not be done.

Here I do not mean to infer that science and proper training are not good. We must not slacken our pace in training for systematic scientific thinking; we will never have enough of these people.

WHAT OBJECTIVES

D. W. Mead stated,

> "The purpose of technical education is not so much to impart technical knowledge to the student as to furnish the training which will enable him to think clearly and accurately, to understand and investigate the conditions which surround the problem, to determine the fundamental principles upon which its successful solution depends, to ascertain and analyze the elements which influence or modify it, to design the structures and works needed for its successful development, to supervise the proper construction of such structures or works, and to carry them to the consummation of a successful and economical completion."

This purpose as stated if carried to a successful conclusion would, in the year 1961, give us a graduate civil engineer satisfactorily trained to start work in the civil engineering field of this atomic age.

We have had in the past and will continue to have in the future similar statements made of professional objectives. Each will probably point or slant more or less to the particular interests of the writer of the statement. I sincerely believe, however, that in its broadest interpretation the statement of D. W. Mead comes the closest to setting forth those broad objectives of the professional practice of the civil engineer.

The specific objective of an education program is mastery of that engineering knowledge which should properly be included in the content of the courses of this curricula. The content of the courses should include those fundamentals which are basic rational facts and generic truths and also constitute the underlying principles of applied science.

To continue this discussion, some statements must be made in order to decide who can be considered a professional civil engineer. It seems reasonable to state that ability to do work which requires a knowledge of technical science would be classed above all other abilities. Also, the engineer with knowledge and experience in his field should be the one to supervise both the young technically trained engineer and others with duties of a sub-technical nature. We do not want to develop men or professional organizations who desire to thrive on the ability of subordinate engineers. We should have the right to expect that all of the professional organizations, and I should add educational institutions, will develop and educate their engineers who have an expectation and hope of further enhancing their position through their professional attainment and knowledge and not through purely business methods.

Civil engineering requires a thoroughly learned education. It is also a vocation. It must have a fairly uniform educational standard as one of the requirements which qualify the man to be eligible for professional recognition as a civil engineer.

If one finishes a prescribed curriculum from an accredited engineering school, one goes into engineering practice and is accepted in the professional society at the proper grade of membership. He is to all intents and purposes

an engineer. In reality, he is still in the training area of his profession. After a stated length of time, if he shows suitable progress, he may apply for the registration examination and when he has successfully passed it, becomes a registered professional engineer. At the same time, if he so desires, he may advance his rank in his professional society thus finally reaching full professional rank in his profession.

The engineering school, the State Registration Board, and the Professional Society each have some part in declaring an individual an engineer. Of course, under the state laws only the registration boards may officially declare the individual registered and, therefore, capable of practicing professional engineering independent of all others if he desires to do so. If may be strongly argued that this procedure of admitting men into the profession of civil or any engineering by divided authority is weak and does not lend itself to uniform standards.

The other method, as operated by the medical profession, wherein the university through its requirement of at least seven years of training, may admit those who have met the rigid scholastic requirements, and who have complied with the required years of internship, to registration as doctors and to become practicing members of their profession immediately. This method has certainly been successful in the medical field and many propose it for the engineering field. This would place a man possibly ready for full professional responsibility at an early age. Many presently in the profession do not support this plan.

A statement is often made that in order to be in responsible charge of engineering work, one must have 8 to 10 years of experience under the supervision of a professional engineer after graduating from an accredited engineering school. State laws now tend to set this limit at 4 years for registration. Registration, however, does not clearly define what degree of responsible charge the man may attain. Some, in fact, may never be given responsible charge of important projects. This depends entirely upon the capability and integrity of the individual.

Civil engineering is in its entirety somewhat different from the other fields of engineering which have branched from it in the past. This difference is exactly why the other societies did develop to full-fledged societies equal to our own. The mechanical and electrical are for the most part interested in industry and manufacturing. Much of their work hinges around production with a commodity to sell. Their products are standardized. They are, except for relatively few, not so interested in registration as is the civil engineer who for the most part is working with the general public. He has relatively few members in industry and those few who are in industry are generally in positions which place them in contact with the public.

The product of the civil engineer is custom-made to perform a given function, be it buildings, bridges, highways, dams, water resources survey, or other problem which confronts him. These projects require the service of many engineers and technical people. This is a natural training and development ground for engineers of all stature in which they may gain experience and learn new procedures and methods parallel with the place in the profession which they have attained. It is not unusual to find young men just out of the university assigned to the design of prestressed beams or the complicated analysis of building frames. All they need is to show their ability and interest and the work will be assigned to them. While these young men would not be assigned

to or expect to be assigned responsibility for a whole project due to lack of experience, this is the way experience must be gained. It cannot all be gained in the laboratory since a bridge or building cannot be moved around so easily as can the patient in the operating room.

The civil engineering profession, or perhaps one should say the work of the civil engineer, differs then materially from that of any other profession, because it has such a large variety of classifications and so many different kinds of activity. We deal with problems of analysis, design, construction, surveys, and economy, to name a few, with the engineer operating in all areas or specializing in only one or two. Yet it is expected that he be capable of working in each. The American Society of Engineering Education, at its meeting in June, 1946, recommended that civil engineering education should emphasize fundamental and basic principles and leave design to be "learned in practice." While this statement was probably not meant to be taken literally, it was written, and there is some indication that this was the intent. Design seems to have become a bad word in the minds of some educators. We have plenty of evidence that many young men, in fact most of them now, are assigned to work of a design nature shortly after leaving engineering school. There is nothing mysterious or sacred about the design of simpler units of structures which cannot be learned in the undergraduate school. In fact, the problems of design are relatively simple intellectually when compared to some of the suggested advanced mathematics courses now recommended for the undergraduate level. Also, it must be emphasized that the practical application presented to the student by the design problem develops an interest and motivation which cannot easily be attained by the so-called basic principles. Likewise, we should bear in mind that the good instructor will carry the basic principles in his design work. The two go hand-in-hand, but more student interest can be created if the subject is recognized as design and that it has genuine practical application.

Engineering works or structures are not a mass production activity; no two are exactly alike. They must be planned and designed to fit the local conditions. Every highway presents its special problems of terrain, grades, right-of-way, land values, cross traffic, city problems, and others. All of these items must be considered by the engineering staff in order to have the structure fit into existing locale to give the best service with present or expected economic conditions. If the final structure proposed fits the location and will do the work assigned to it efficiently, the cost of design will be balanced by the saving made by the structure. Regardless of what the structure or project may be, good engineering will always be economical as determined by the performance of the structure. Members of the profession carry the obligation to perform the engineering service requested to the best of their ability and judgment at all levels of experience and training.

In addition to the engineers engaged in purely technical work, there is today a large block of engineers engaged in an area which may be called management. The larger consulting firms, government agencies, construction firms, and other organizations, all employ administrative managers who have advanced to their positions of administration from their experiences in the lower ranks of engineering service. These practicing engineers who have grown to stature through their practice as professional engineers represent the top of our profession. No longer is the professional engineer a one- or two-man office. We must recognize the fact that professional civil engineering work is a work of many branches wherein specialists in many fields may be needed. This is true in any

sizable organization, be it consulting firm or government agency. On the other hand, the engineer for a small city may need to know a little about many of the branches, and must possess the knowledge and foresight to call for professional help when needed. Thus we find innumerable different kinds of positions and outlets open for the civil engineer. Each has a specification for the kind of training to best fit the position. Some will require men with exceptional intellectual ability but may not place as much weight on some other characteristics. Other positions will require particular emphasis on personal characteristics, and desire only average technical ability. Still other positions will need men with all shades of qualities between the extremes. Some of these positions have relatively low salary ceilings compared to others, but have other values which seem to offset the purely monetary gain involved. Each seems to find technically trained men from engineering schools to fill them.

Looking now at the engineering school again, each graduating class of civil engineers contains about 40% of those who entered as freshmen. The mortality is high or, to state in another way, we may say that the graduate of any engineering school - even though he may be at the bottom of his graduating class - still has considerable ability. He has shown a capacity to learn although admittedly in the eyes of the faculty not so well as the man at the top of his class. Nevertheless, both have good opportunities in the profession of civil engineering since there are many qualities other than grades which may contribute to success in later life in the profession of civil engineering.

It is true that one special area of engineering training is closed to all but approximately the upper 20% of any graduating class. This is the group which may be accepted to study for advanced degrees and work on research problems as a part of their advanced degree work. Experience has shown the educator that only those with excellent undergraduate records have a reasonable chance of mastering the rigorous work of the graduate area. These are the people who are capable of learning and understanding the abstractions of mathematical and scientific theories which reach beyond the calculus. People who attain only an average grade in the undergraduate mathematics have little chance of attaining a higher grade in the stiffer competition of the graduate years. Thus the lower limit requirement for acceptance to our graduate engineering schools.

Now, since the graduates from the engineering schools of today are the young professional engineers of tomorrow, we as engineers must decide how we will accept them in the profession. How many graduates do we want and of what quality? Two decisions may have to be made. First, at the present time and under present standards, we can expect about the same number as in the past. Enrollments have been decreasing for the past few years but are expected to increase in the years ahead.

Second, we have the question of the effect on enrollment and mortality as a result of the stiffening of mathematics and science requirements of the ECPD accreditation procedure. In the civil engineering field, these requirements are causing the departments to eliminate some key courses which are considered essential by many to the broad training in the field. These are certainly more important to the student than some of the general science courses required, which are definitely beneficial in other fields and admittedly of value for the research field. It may be expected that the mortality of entering students will be much higher than in the past, if the standards of the courses in the freshman and sophomore levels are maintained at the target set. Also, most of the motivation and interest generation subjects are eliminated. It

would seem to be a very deadening course for the average young man who has been guided to the civil engineering profession by the extensive guidance programs in our secondary schools today.

The new curriculum with its standards will leave fewer graduates than we have had in the past but, at the same time, the quality may be better since the course subjects will be more advanced. More of these men may be expected to go on into advanced degrees and research, thus depleting the number who will be available for the normal civil engineering work of today. At the present time no provision is made for the training of those who now are in the lower brackets of the graduating classes of today. This can seriously affect the amount of engineering talent at the normal level as we accept it today.

This situation could be remedied by providing a less rigorous requirement in the first two years, allowing the individual time to adjust to the college programs and, at the same time, providing him with some interest subjects in his chosen field. After all, engineering is certainly applied science. Therefore, the earlier he can become familiar with some of the applications, the sooner that all-important commodity to the learning process - interest - will be aroused. Nothing is more deadening to the young engineering student than hour after hour of theoretical basic science when he thinks he should be able to try visual application. If it is not deadening to him, then he should probably be enrolled in the school of science rather than engineering.

GENERAL OBJECTIVES

Two objectives are apparent in engineering educational philosophy today: one, training for research, and the other, training for the practice of civil engineering. One is quite different from the other, both in its objectives as well as in the disciplines required for successful accomplishment of work in either.

Those who desire to be in the field of research must, of necessity, span as wide a field of basic fundamental principles of mathematics and science as time will allow. Certain minimum standards are set at present but they should be encouraged to pursue as broad a field of knowledge as time will allow. The student of excellent ability will do this without additional prodding, for he is an individual who is capable of entering the research field and has the knowledge and understanding to comprehend the need for this broadening of his intellectual horizon. He will want every possible tool at his disposal for use in the work ahead of him.

At the present time, only those who show evidence in the undergraduate years of a gifted ability in academic work are permitted to move into graduate work. They have shown ability as measured by their academic grades. For most students this characteristic shows plainly by the end of the sophomore year. The graduate schools with research grants at the present time look to these students with an envious eye as potential graduate students to continue on to advanced degrees. Good substantial financial aid in the form of scholarships, fellowships, and assistantships are available for these students, allowing the cream of the graduating seniors to pursue advanced study. Such financial aid provides an excellent opportunity for these scholastically talented students to earn their advanced degrees. Their programs of study require the advanced tool courses in science and mathematics which will be most likely to aid them in the research program.

In addition to the regular course study of the graduate program, the student will generally be assigned a research project associated with his major professor's field and his field of specialization. Over this period of 3 or 4 years of study and research work which is required for the PhD, the student naturally becomes interested in research or, in many instances, teaching. Therefore, at the time of completion of graduate degree work, he feels more familiar with it and is inclined to locate in a position requiring that type of training. In fact, he will still be lacking any experience with practice in the field of engineering. Few consulting firms or government agencies appear to interest these graduates or offer the salaries they should logically expect after the extra years of training. This condition may change in the years ahead. There is, however, a demand for them at the present time in the defense industries of the space, areo and missile programs which, as yet, are in the research and investigative stage.

The man with the advanced degree has surely a wonderful field of work ahead of him in the form of research. We have learned since the end of World War II how to attack new problems. We have learned what tools are required and how to combine the talents of individual members of research teams to search out new ideas. It would seem logical to me to go a little further and locate these students who have a flair for research and definitely point their training in that direction. This can be done without the stigma of segragation which sometimes shows up in the honor classes at the present time. The course, designated as "research engineering," would start as a special program at the beginning of the junior year, with enrollment limited to those who have maintained a predetermined grade point average for the first 2 years and would include stipulated courses in mathematics and science beyond those required the first 2 years. These would be the people who could reasonably be expected to satisfactorily complete the advanced mathematics and science courses needed for advanced work at the graduate level of training.

Those students who were not accepted into the research program would continue with a program not so steeped in science and mathematics. They actually comprise about 80% to 85% of the present enrollment in the engineering schools today. They, along with the ones separated out for research, will, during the first 2 yr, carry a normal load of mathematics and science courses; not one overloaded with them. They should be required to study at this level those normal tools of the civil engineer of which in practice he is expected to have a working knowledge for the practice of his profession. I refer here to drawing, surveying, and materials laboratory for example. There are plenty of choices which may be used at this level which will motivate the student and thus not discourage him before he has mastered the rudimentary tool courses of his profession - mathematics and science.

This larger group of average students should continue on in curricula designed to give them the application of science to the practical problems of the engineer, if one desires to so designate them. What we actually are considering are the problems of theory, analysis and design of engineering structures or, in other words, the solution of engineering problems. One may probably best include all by stating we refer to any problem which may be imagined to develop in the work of engineering, and which can be related to any one of the fourteen technical divisions of ASCE. Some may claim that this is cheapening the profession of civil engineering but I do not think this to be the case. Our youth cannot all be accepted for graduate work nor does the Doctor's degree mean

that he who holds one may be a better citizen or professional engineer than one who does not. It does mean that he has qualified in certain specialized fields to do a certain type of work and may, perhaps, be able to demand a higher salary, if that be a measure. However, we know of many professional engineers who demand salaries far higher than many with the PhD.

We have far more work and demand for engineers who have not mastered all of the finesse of mathematics and science than for those who have. There has not yet been proven the need for numbers of men in this category, but there is need for the engineer who can plan structures, design them and build them. There is need for highway engineers, construction engineers with a sense of practical application of a few fundamental scientific principles and who can fasten the units to the ground for utilitarian use.

These are the 80% to 85% of the student enrollment in engineering at the present time. Also, we should bear in mind that not all of the top 15% to 20% will accept the research program or graduate study.

All of these men are needed today in the civil engineering profession. We should not lose them to the profession by stiffening our course requirements to the point where most will have to withdraw and turn to other fields of endeavor. Also remember, these are college people who are close to the top of the intellectual ability of the nation. They will, as you, make good reliable professional engineers of the future and carry their fair share of the engineering load. I believe we need them in our profession. Remember, in any civilization not all can be generals.

Education to this group of students must carry with it inspiration and interest as well as experience: inspiration to the extent that it will be continued after the college degree is earned even though the individual is not accepted to the graduate school. There is evidence that educators have neglected the inspirational approach which is needed to stimulate students to extend themselves in their quest for knowledge. It is often stated that the engineering student is taught to work, which is certainly valuable, but to learn to work with effectiveness and efficiency is most valuable to him in his later years. He should learn to use all the tools available to him, how to work from books or the printed page, drawings, how to separate the valuable information he needs, how to trace out a truth. These are abilities the engineer needs to have and they will prove as important to him as many other disciplines he learns in formal course work.

It is often said that practice cannot be taught in college, mainly because you cannot be sure in what field of engineering the student will specialize. Is not precisely the same thing true with portions of our mathematics courses? I think it is. The rudiments of practice should be started early in the career for this is the area in which professional standards and ethics may be most effectively impressed on the young man. In the formative years of college, three or more years of contact give the professional-minded instructor ample opportunity in incidental instruction in the class to impress the value of the professional attitude. It will not be gained in six easy lessons. Professional attitude is a characteristic which must grow and develop in the individual. It takes cautious instruction, reading, illustration, meeting professional engineers over the college years to have the roots of it by the time of graduation. Such contacts and ideals properly applied during the undergraduate years will

send the young man into the profession with an attitude that will continue professionally throughout his career.

AFTER GRADUATION

The education of the engineer does not end with graduation from engineering school. In fact, it is in reality the beginning or commencement time. It represents the time of completion of his formal basic training, when he has the roots laid for his future growth in his profession. To continue his education for his own advancement in the profession and to keep up with the rapid advances taking place every day one may find no better environment than in the activities of the technical division of the society. So I want to discuss with you the Department of Technical Activities as an avenue for continuing and broadening engineering education. Also in this discussion, I would like to praise the work of this department.

To the writer, one of the inspiring experiences of serving as an officer of the society is the opportunity to become better acquainted with the wide variety of constructive activities by members and groups of members. The extent of the work is seldom realized by the membership, probably even by those serving in some part of such activity. Of interest to the writer has been a study of those activities whose purpose is the advancement of engineering technique. This activity provides a wonderful part of the society in which to participate and further enhance the mastery of knowledge in our chosen field of engineering. I fear that too few of our membership do actually participate in the affairs of the divisions. For a moment I suggest you review with me a quick appraisal of the work.

More than 1,500 members of our society are serving on approximately 300 committees, all dedicated to the practice of civil engineering. These committees represent the 14 technical divisions and also act in a joint operation with some 20 other societies or associations.

This committee organization is vast in geographical extent as well as in subject material involved. Members are attracted to this work from every section of the country, from every type of specialty, and from all age groups of membership. Subjects for study range all the way from the highly technical assignments such as the committee on Experimental Analysis and Analogues of the Engineering Mechanics Division, to the more general undertakings of such Committees on City Planning Functions in Municipal Administration of the City Planning Division. Some committees stimulate research of the highest theoretical order, others develop standards of practice, while still others provide a facility for the sharing or dissemination of new information in the professional meetings and conferences or in the publications of the society.

Diverse as these efforts are for the purpose of effective administration, the society has established a streamlined pattern of organization. The committees of a division are coordinated in their effort by an executive committee; in turn the executive committees are coordinated by board appointed administrative committees and coordinating committees. Holding responsibility for the whole operation is the boards Committee on Division Activities. Some very interesting things are happening within this area of our society's effort. To single out for mention any one such effort is hazardous. However, I believe that most

generalities must be supported by specific examples. There are many such examples. Take the work of the Committee on Electronic Computation for one.

This committee of the Structural Division has taken a brand new field of engineering interest (new as compared with the wisdom of the ages) which is incorporated in engineering practice, and has persuaded people to provide a wealth of new information about the application of electronic computers to the solution of engineering problems. They have done this by attracting over 50 very special men to a variety of committee assignments and, through this cooperative endeavor, through encouraging studies, planning conferences for the discussion and exchange of ideas, and providing a publication outlet for the new ideas, interest has been generated in the process. The two volumes of Electronic Computer Conference papers are found in libraries and offices everywhere as valuable references for those who are finding use of these new techniques extremely valuable.

Take for another example, the Industry Oriented Committee of the Pipe Line Division, studying the knotty problem of pipe line crossings of railroads and highways. This committee and a handful of members brought together almost 100 representatives of different groups concerned with the problems including direct representatives of a dozen other associations. Organized into subcommittees, this group has found the money to support an extensive research program being conducted in several locations throughout the country. As more reliable information is produced in the process, this group plans the adoption of standards which will serve the public and industry and reduce the costly arguments which have occurred over the adequacy of such crossings.

An entirely different type of committee activity was that of the Surveying and Mapping Division, which produced the splendid study of the status of the engineer in surveying and mapping. The findings of this overall but dedicated group have given cause for a review of contracting, registration and educational procedures throughout the fifty states.

A prerogative of a president is to recognize such accomplishments and hold them up as examples to be emulated before the membership. It is also the prerogative of the president to bring to attention those aspects of our operations which need improvement. I am going to exercise that prerogative also.

When we have 300 committees in operation, manned by 1,500 high grade professional people, there is every right to expect that some of these groups will make more progress than others and that some, by comparison, will be in operation for some time before they produce much of any consequence. But, must we be satisfied to continue in operation those committees which persist in lack of accomplishment? Careful scrutiny would indicate that some few committees continue primarily as an excuse for a few kindred spirits to meet occasionally, swap information for the interest of the small group involved, and maintain names on lists of various sorts - for whatever value this may be.

I would like to see such committees set higher goals of accomplishment, become more productive in the interest of our profession, or be replaced by other groups of greater promise.

The formation of a committee merely to hold meetings or merely to list names in records is not a credit to our society or to the men involved. Worse, it tends to discourage aggressive accomplishment of the individuals who come to believe that this is standard operating procedure.

I would like to charge our administrative committees to nudge such committees into more productive patterns, or to find new people to carry out assignments felt to be deserving of energetic attention!

If I may be pardoned expression of another concern, I would like to draw another murky word picture for your attention. We have so many committees in so many societies and associations and councils. We have so many meetings and conferences and conventions, conducted by this and other organizations. So many of these activities have grown to be competitive, conflicting for the time of men, for attention of the profession, and for credit for whatever accomplishment is made.

This proliferation or organization is not a credit to a profession which is dedicated to creating things that are better and simpler and more economical. Our society has made progress in the direction of cooperative ventures and consolidation of interests. Examples are found in the "joint committees" of our divisions, in the combined conferences with two or more organizations cooperating. But these efforts have been feeble as contrasted with the growth of competitive activity. A practicing engineer could serve on any one of similar committees in half a dozen societies and not know which group he is serving currently. Some do serve on similar committees, pursuing the same objectives in several associations. Or, he could be in constant attendance at conferences and conventions going from one to another like a traveling salesman with no time left over for the practice of his new-found knowledge.

We should be setting an example in cooperation and coordination of such efforts. We should work unceasingly to persuade other organizations to match this effort. Fewer committees and better committees - fewer meetings and better meetings should be our goal!

Related to the work of our technical committees is the restless stirring of research activity. As funds have become available, civil engineers have come to recognize the "need to know" more about the materials with which they work, more about the systems into which such materials are fitted, more about the use of such systems in the service of mankind's needs. While it is only recently that our profession has come to have profound respect for research, rapid strides have been made. Leaders of such progress have been those who were research-minded all along. Their converts are legion.

Such growth into a new area of endeavor has been recognized in our society organization also. Committees in our divisions are reviewing needs, advising projects, encouraging the outlet of information.

Only 1 year old is the provision for research councils in the structure of ASCE. These are related closely to the efforts of the technical divisions but provide opportunity for the consolidation of effort and avoidance of competition, which seems appropriate.

Newest of these councils is the one devoting its attention to Air Resources Research, a product of the Sanitary Engineering Divisions Committee on Atmospheric Pollution Abatement.

There are many other fields of research in civil engineering which could profit from this type of organization, stimulation, and guidance. I hope our society can extend its leadership in this.

To do so, it is planned to expand our research management capacity. This effort has the endorsement of other research-oriented organizations, including very tangible financial encouragement of the Engineering Foundation. I hope this effort can grow rapidly into effective productivity.

An essential to the advancement of engineering technique is the free outlet of new ideas in publications of all useful sorts. The earliest activity of our Society was to encourage the presentation of papers and publication of such so that professional minds everywhere could be informed and stimulated. In our

profession, our society has gained leadership and stature through the volume and quality of its publications. The huge publishing enterprise now in operation commands the efforts of hundreds of our members and is very costly. But, we must maintain and expand this capacity to print and to circulate engineering knowledge. We must find new and more effective media as publishing techniques improve and as the competition for the reader's eye grows more acute. We have ever before us the challenge to find ways to carry more ideas with fewer words and fewer pages and fewer volumes.

Where can our members find a medium for keeping abreast of the technological advances other than in this Department of Technical Activities? There is opportunity here for every possible interest in the civil engineering profession. ASCE welcomes all of its members to use all of the facilities of this activity to enhance the depth of their professional education. Attend the technical sessions at the national meetings; attend the conferences of the divisions in your field; read the journals of the society and participate in the discussions. It is your society: help to make it a better society.

ON CONDITIONS OF PRACTICE

Of equal stature with the technical divisions of the society are the committees of the Department of Conditions of Practice. A review of the committees and their assignments emphasizes that this is the area of society work which deals with the professional qualities of the civil engineer. The men who give their time on these committees have in many assignments difficult, perplexing problems and, I might add, sometimes disagreeable duties to perform, but they do them unstintingly for the welfare and prestige of the professional society. I wish to commend them and thank them for their devoted service to the society.

I have mentioned the intensive work of the Education Committee. Now I would like to call attention to the young members of the society, the committees which especially have their interests at heart. I would say to you to find out about and to take an interest in their work. This will help you materially in your professional development on your entrance into the profession. The young men as well as old should also not forget the student chapters which they have recently left, for they from their fresh experiences may lend a hand in this area.

Finally, most writers on the professional man in engineering will conclude that professionalism deals with services for a client, either an individual or group of individuals. Also, that a close relationship is present between the professional engineer and his clients. One cannot lay aside the fact that the professional civil engineer deals with things in all of his work, but wherever he is working with things, he is planning to use them for the benefit and service of a client. Thus, so far as the professional is concerned, he is dealing with people wherein a successful service is dependent upon a mastery of knowledge in the field in which the service is to be rendered. However, one must remember that knowledge alone is insufficient for professional service. It must in our field be supported by experience with an element of recognized reliable responsibility.

A valid appraisal of professionalism must give careful consideration to the view taken by the engineer toward his client, the general public, and other members of the profession, in which an honest compromise is made in evaluating

monetary gain for self and the welfare of the client and others who may be affected, in order that one does not cause harm to the other. This attitude may be observed to emerge in the individual through any one of a number of ways, each equally meritorious: through work in professional societies, work published by professional societies, good service to clients, and community service. Each alone or in combinations is a good index of professional attitude in that it indicates service without direct benefit.

Professional services are such that they may not be completely enumerated previous to an assignment, but rather must depend upon the integrity of the professional man employed. His ethical standards as well as his mastery of knowledge, experience, and whole performance record must be considered in the transaction. His professional attitude is of utmost importance as a guarantee of faithful completion of an assignment, however it is not possible to write a specification for service of this kind. They are not a product to be purchased but, instead, they are backed by the professional responsibility and integrity of the individual.

The foregoing discussion on professional attitudes does not mean that these make the individual but rather that they are essential to make the complete professional and, therefore, should be evaluated as a part of the professional. Excellent performance in the profession also depends on mastery of knowledge in the field, supplemented by the proper professional attitude. Engineering with its methods of work and organization of knowledge has developed its education to the position we all know today.

The level of mastery for the engineer should be placed at a rational and valid value. Engineering which relies to a large extent on advanced science without regard for those other traits which have long been considered a part of the professional world can certainly be challenged. The scientific side of engineering has been pushed to the fore-front in educational thinking to bring us to a dangerpoint.

Professional engineering today has a common accepted meaning to both the men in the profession as well as people not in engineering. We wish our education procedure to grow logically as scientific learning and research develop.

The professional service which the practicing engineer is called upon to render cannot be systematized in all areas, nor can it be defined or clearly indicated in advance of the time the service is to be rendered. The engineer must at times pursue his work outside and independent of the realm of formularized knowledge. His methods of work must incorporate the ideas of art with his knowledge of science in order to properly bring the engineered project to a successful and satisfactory solution. If the art aspect of civil engineering work is reduced to a level wherein it loses its recognition in the educational process in the undergraduate years, then the ideal which we call professionalism will also be lost to civil engineering.

Here a large number of our members give their time to work for the professional recognition of each of us who are in this profession of civil engineering. Here is the area of our profession which deserves the best support which each may give, also our best thought in order that our profession may continue to flourish and be strong.

Perhaps I may summarize the work in the professional area by stating that the work of these committees parallels the work of the technical divisions, warrants the same thanks and praise, but, in addition, each committee in the professional area has an interest in each individual engineer.

I have recalled these ideas on education for the profession of civil engineering practice to your attention today to alert you to the fact that our profession requires not only knowledge of science but those larger qualities which fit an individual to live with and conduct himself as a professional man in the community in which he operates, and to remind you that the life of the profession always depends upon the young people who come to it each year.

MEMOIRS OF DECEASED MEMBERS

Abstracts[a]

Past-President

Honorary Member

Other Members

[a] The memoir abstract is intended as a statistical record, leading the searcher to a more complete biographical memoir manuscript catalogued in the Engineering Societies Library.

WALTER LEROY HUBER, PAST PRESIDENT[1]

Died May 30, 1960

Walter Leroy Huber, the son of Millard Fillmore and Celia (Dill) Huber, was born in San Francisco, Calif., on January 4, 1883. He was graduated from the University of California (Berkeley) with the degree of Bachelor of Science in civil engineering in 1905.

Mr. Huber obtained his early professional experience in structural design as an Assistant Engineer with J. D. Galloway. In 1908 he was chosen Chief Engineer by the Supervising Architect of the University of California's building program. After 1941 the partnership of Huber and Knapik did extensive work for the University. For his professional accomplishments Mr. Huber received the Honor Award of the Building Industry Conference Board in 1953. Because of his knowledge of hydro-electric design and his familiarity with the mountains (he led parties which were the first to climb some of the Sierra peaks), in 1910 he represented Galloway and Markwart in surveying for a possible hydro-electric project on the Calaveras River; he was, too, a District Engineer for the United States Forest Service. Although most active in the structural, hydro-electric, and irrigation areas, he undertook special studies in flood control and municipal water supply. Mr. Huber was an authority on earthquake resistance and published works concerning his studies on seismic forces. Concerned also with the utilization of mountain water, Mr. Huber acted as consultant for the Nevada-California Power Company and the Southern Sierras Power Company; his assignment with the former was still in effect at the time of his death. During WWI he explored and surveyed the Little Colorado River and served with the State Engineer's Committee preparing the original report for the Central Valley Project. He was consultant for the California Department of Water Resources on the State Water Plan and for the War Department; was employed by San Francisco, Calif., in connection with its Cherry Valley Dam and Hetch Hetchy Power Development; and was consultant on the Sacramento Municipal Utility District's American River Power Development. In 1954 President Eisenhower named him Advisor to the President on a controversial survey of the Arkansas-White and Red River Basins. In 1953 he was appointed to the Advisory Board of National Parks, Historic Sites and Buildings and Monuments; he was a Chairman of the Board until 1959. Mr. Huber also served on the Board of Directors and as the Vice President of the California Academy of Sciences. He was elected a Fellow in 1956. In 1955 his alma mater conferred the degree of Doctor of Laws on him.

Mr. Huber was a registered engineer in four states; a member of Tau Beta Pi; Phi Sigma Kappa; Chi Epsilon; The American Concrete Institute; the American Institute of Consulting Engineers; the Seismological Society of America; the Academy of Sciences, San Francisco; the Engineer's Club of San Francisco; the Commonwealth Club of California; the Society of California Pioneers; the

[1] Abstract of a memoir prepared by H. H. Hall, F. ASCE, and Robert D. Dewell, F. ASCE.

California Historical Society; the Sierra Club; the American Alpine Club; and the Mechanics Institute of San Francisco.

On November 11, 1941, Mr. Huber was married to Alberta Mann Reed in Los Angeles, Calif. He is survived by his widow; a sister; and a brother.

He was elected a Junior Member of the Society on April 3, 1906; an Associate Member on March 1, 1910; a Member on June 12, 1917; and a Fellow on June 6, 1959. He was President of the San Francisco Section in 1936; Director of the Society from 1922 to 1924; Vice-President of the Society from 1926 to 1927; and in 1952 he was elected President of the Society. In 1953 he represented the Society at the European-United States Engineering Congress.

ROBERT JAMES CUMMINS, HON. M. ASCE[2]

Died June 11, 1960

Robert James Cummins, the son of James and Minnie (Harshaw) Cummins, was born in Mountmellick, Ireland, on March 1, 1881. He was graduated from Queen's College of the Royal University of Ireland (Galway) in 1900 with a degree in engineering.

Shortly after graduation he came to Detroit, Mich., where he worked for ten years as a Civil Engineer for the City of Detroit and as a private Consultant. In 1910 Mr. Cummins moved to Houston, Tex., where he remained until his death. He laid out the harbors and designed the original facilities for the ports of Brownsville, and Corpus Christi, Tex. For twenty-five years he was a member of the Houston Port Commission, serving as Vice-Chairman for fifteen years; he also designed major port facilities in Freeport, Port Arthur, Beaumont, and Orange, Tex.

From 1918 to 1921, in addition to his consulting practice, he was an Instructor in engineering at Rice Institute, Houston, Tex. Mr. Cummins also served as Engineering Adviser to the Reconstruction Finance Corporation during the 1930's, and as Adviser for the construction of the San Francisco-Oakland Bay Bridge, Calif. He was Structural Engineer on numerous major buildings, including the San Jacinto (Tex.) Monument, a 555-ft shaft commemorating Texas independence, completed in 1936, and the 31-story First City National Bank, Houston, the tallest all-welded steel frame in the world, under construction at the time of his death.

In 1953 Mr. Cummins was named "Engineer of the Year" by the San Jacinto Chapter of the Texas Society of Professional Engineers. He was President of the Texas Section of the Society in 1940 and of the Houston Engineers Club in 1923, and a member of Tau Beta Pi and Chi Epsilon. He was also Technical Adviser for the International Boundary Commission in the United States and Mexico; Chairman of the Board of Directors of the Travelers Aid Society; and

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[2] Abstract of a memoir prepared by James A. Cummins, M. ASCE.

a Director of the Houston Chamber of Commerce. Mr. Cummins was Treasurer of the Central Presbyterian Church of Houston for forty years; a Director of the United Presbyterian Synod Foundation; and a Trustee of both Central Church and the local Presbytery. He belonged to the Houston Rotary Club, and served as Vice-President in 1927.

On April 4, 1926, Mr. Cummins was married to Sascha Morrison in Houston, Tex. He is survived by his widow; a son, James Alexander; two daughters, Mary Adelaide (Mrs. Charles E. Jones) and Jean Helen; four grandchildren; three sisters; and a brother.

He was elected a Member of the Society on November 9, 1920, and a Fellow on June 6, 1959. He was elected an Honorary Member on June 14, 1954. Mr. Cummins became a Life Member in 1952.

BENJAMIN CASEY ALLIN III, F. ASCE[3]

Died January 10, 1960

Benjamin Casey Allin III, the son of Benjamin Casey II and Josephine A. (Turner) Allin, was born in Chicago, Ill., on November 14, 1886. He was graduated from the University of Chicago (Illinois) with the degree of Bachelor of Arts.

Mr. Allin served in various professional capacities until World War I, when he was a Captain in the United States Corps of Engineers. He was Director of the port and Chief Engineer of Houston, Tex., from 1919 to 1931, and of Stockton, Calif., from 1931 to 1942. After serving as a Colonel in the United States Army Reserve in World War II, Mr. Allin was a Consultant Engineer until his death.

He was President of the Pacific Coast Association of Port Authorities; Vice-President of the American Association of Coast Authorities; a member of the International Science Foundation; the Consulting Engineers Society of California; and the Masonic Order. He was also an active layman in the Episcopal Church.

On May 24, 1913, Mr. Allin was married to Dorothy May Newell in Chicago, Ill. He is survived by his widow; a son, Benjamin Casey IV; a daughter, Dorothy Jean (Mrs. Malcolm A. Blanchard); and six grandchildren.

He was elected a Member of the Society on February 13, 1945, and a Fellow on June 6, 1959.

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[3] Abstract of a memoir prepared by Miss Mary Elizabeth Jones.

DAVID ROBINSON ALLMOND, JR., M. ASCE[4]

Died November 2, 1960

David Robinson Allmond, Jr., the son of David Robinson and Ella (Porter) Allmond, was born in Wilmington, Del., on May 23, 1899. He was graduated from the University of Delaware (Newark) in 1922 with the degree of Bachelor of Science in civil engineering.

His early experience included employment with the American Bridge Company in Philadelphia, Pa., and the Illinois State Highway Commission. From 1927 to 1940 he was with the Standard Oil Company of California, specializing in asphaltic paving. Mr. Allmond continued in airport and road construction with contractors in Hawaii and California until World War II. In 1943 he became an officer in the Civil Engineer Corps of the United States Naval Reserve and engaged in airport construction in Guam and other Pacific islands with the "Seabee" forces. From 1946 to 1954 he was employed by the Hawaiian Bitumuls and Paving Company, Honolulu, and from 1954 until his death was with the Craig Company of Honolulu, Hawaii.

Mr. Allmond was a member of the Masonic Order; Tau Beta Pi; and Phi Kappa Phi.

He is survived by a brother and two sisters.

He was elected a Junior Member of the Society on July 12, 1926; an Associate Member on October 24, 1932; and a Member on June 6, 1959.

DONALD McCORD BAKER F. ASCE[5]

Died October 1, 1960

Donald McCord Baker, the son of William Parnell and Clara (McCord) Baker, was born in Poway, San Diego County, Calif., on November 25, 1890. He attended the University of Southern California (Los Angeles) and was graduated from the University of California (Berkeley) in 1911 with the degree of Bachelor of Science in civil engineering.

From 1911 to 1917 he was an Engineer in the United States Irrigation Service, working in Arizona, New Mexico, and Colorado; from 1917 to 1924 he was Hydraulic Engineer for the California Water Commission. Mr. Baker went into private practice as a Consulting Engineer in Los Angeles and in 1942 became

4 Abstract of a memoir prepared by Richard H. Cox, M. ASCE.
5 Abstract of a memoir prepared by Thomas M. Stetson, M. ASCE.

a partner in the consulting firm of Ruscardon Engineers, Los Angeles. From 1954 until his death, he maintained a private consulting practice in Los Angeles. In 1951 he read his paper, "Safe Yield of Ground Water Reservoirs," before the Association Internationale d'Hydrologie, at Brussels, Belgium.

He was a fellow of the American Geographical Society; a member of the American Association of Engineers; the American Academy of Political and Social Science; and the AWWA.

On May 9, 1917, Mr. Baker was married to Ruth Marenus Sidey in Los Angeles, Calif. He is survived by his widow and a brother.

He was elected a Junior Member of the Society on December 3, 1913; an Associate Member on January 19, 1920; a Member on March 11, 1929; and a Fellow on June 6, 1959. He became a Life Member in 1955.

ALFRED EDWARD BARNES, M. ASCE[6]

Died May 11, 1960

Alfred Edward Barnes, the son of Alfred E. and Catherine (Cross) Barnes, was born in Kansas City, Mo., on March 5, 1892. He studied by extension with the Society Beaux Arts Architects.

He began his professional career as a draftsman with Hoit and Price, Architects. In 1919 Mr. Barnes became a member of the architectural firm of Hoit, Price and Barnes which designed many buildings in Kansas City including the Power and Light Building; the Telephone Building; and the Federal Office Building. The firm was dissolved in 1941, and he became a Coordinating Engineer at the Lake City Arsenal. From 1945 to 1958 he was associated with the Long Construction Company.

Mr. Barnes was a former President of the Kansas City Chapter of the American Institute of Architects and the Architectural League of Kansas City; he was a member of the Society of Military Engineers; the Kansas City Club; and St. Andrews Episcopal Church. He was long active in the development of the Kansas City Art Institute.

In 1931 he was married to Clara Knotter. He is survived by his widow; two daughters, Gerardine Claire (Mrs. David Conrath) and Catherine Anne; and a grandson.

Mr. Barnes was elected an Associate Member of the Society on August 27, 1928, and a Member on June 6, 1959.

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[6] Abstract of a memoir prepared by G. H. Kevan, M. ASCE.

JOSEPH GARFIELD BASTOW, F. ASCE[7]

Died November 27, 1960

Joseph Garfield Bastow, the son of Joseph and Dorothea (Christensen) Bastow, was born in College, Utah, on August 14, 1892. He was graduated from Utah State College (Logan) with the degree of Bachelor of Science in civil engineering in 1921 and received the degree of Master of Science in civil engineering from the University of California (Berkeley) in 1923.

He began his career in 1923 as a Designer for the Western Pipe and Steel Company, San Francisco, Calif., and was an Engineer of Water Supply Investigations for the East Bay Water Company, Oakland, Calif., in 1924. From 1924 to 1926 he was with the Standard Oil Company, Richmond, Calif., first as Structural Designer and then as Job Engineer. In 1926 Mr. Bastow joined the Port of Oakland where he remained until his retirement in 1959. He served consecutively as Structural Designer; Chief Structural Designer; Assistant Engineer; Chief Engineer; and Assistant Port Manager in charge of engineering. During this time he supervised the design of structural steel and reinforced concrete piers and warehouses, the principal installations of the Oakland harbor.

Mr. Bastow was a President of the East Bay Engineers Club; and a member of the Society of American Military Engineers; the American Association of Airport Executives; and the American Association of Port Authorities.

On May 1, 1918, he was married to Irene Ricks in Salt Lake City, Utah. He is survived by his widow; three sons, Joseph Garfield, Jr., Wendell Ricks, and Paul Gordon; seven grandchildren; a sister; and three brothers.

Mr. Bastow was elected an Associate Member of the Society on October 1, 1926; a Member on September 1, 1950; and a Fellow on June 6, 1959.

WESLEY P. BILIFFERT, M. ASCE[8]

Died February 10, 1961

Wesley P. Bliffert, the son of Phillip J. Bliffert and Anna C. (Monday) Bliffert, was born in Milwaukee, Wis., on April 2, 1907. He was graduated from the University of Wisconsin (Madison) with the degree of Bachelor of Science in civil engineering in 1928.

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[7] Abstract of a memoir prepared by Ben E. Nutter, F. ASCE.
[8] Abstract of a memoir prepared by Ralph A. Hoffman, Life Member, ASCE.

Mr. Bliffert was a salesman at the Bliffert Coal and Oil Co. from 1930 to 1932; he was then employed by the Tews Lime and Cement Co. for seventeen years, first as a salesman and then to design the plant and policies for their redi-mix concrete cement business. He founded the "Wes" Bliffert Concrete Company in 1949 and was President and Manager until his death. Mr. Bliffert served as an officer in the "Seebees" from 1942 to 1945 and aided in the construction of air strips in the Pacific theater. He later became a Lieutenant Commander.

Mr. Bliffert was a member of the Engineering Society of Milwaukee; a Trustee on the Village Board of Shorewood, Wis.; a member of the Wisconsin Society of Professional Engineers; and was a leader in the Boy Scouts of America for seventeen years.

On June 16, 1930, Mr. Bliffert was married to Bonnie V. Potter in Dallas, Tex. He is survived by his widow; his mother; a son, Ronald; and a granddaughter.

He was elected an Associate Member of the Society on August 12, 1940 and a Member on June 6, 1959.

ELMO WILLIAM BOEHL, M. ASCE[9]

Died July 11, 1959

Elmo William Boehl, the son of William and Johanna (Rath) Boehl, was born in Cuero, Tex., on January 21, 1908.

He began his career as an Assistant Surveyor with W. R. Garrett Abstract Co., Cuero (1928 to 1931); was Assistant Plant Inspector for the Texas Highway Department at Cuero (1931 to 1932); and Office Engineer for the Texas Highway Department at Beeville, Tex. (1932 to 1934). From 1934 to 1936 Mr. Boehl was Assistant County Engineer in Bee County, Tex., where he supervised the construction of grading and drainage structures. For the next four years he was Assistant County Engineer in Nueces County, Tex., and afterwards was an Assistant Engineer for James Stewart and Company, Corpus Christi, Tex. (1940 to 1942). For a year during World War II, he was a Civil Engineer on the United States Naval Air Training Station at Corpus Christi. After working as a Structural Engineer, he became Vice-President and Manager of the structural department of Texas Engineers, Dallas, Tex., in 1951; he maintained these positions until his death.

Mr. Boehl was an active member of the Lutheran Church; a member of the American Petroleum Institute; and a Registered Professional Engineer in Texas.

On November 11, 1932, he was married to Flora Koehler in Cuero, Tex. He is survived by his widow; two sons, John Elmo and Gleen Edward; two brothers; and two sisters.

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[9] Abstract of a memoir prepared by William J. Powell, F. ASCE.

Mr. Boehl was elected an Associate Member of the Society on October 20, 1947, and a Member on June 6, 1959.

BERNARD WILLIAM BOOKER, F. ASCE[10]

Died July 18, 1960

Bernard William Booker, the son of Bernard Frank and Mary (Staffan) Booker, was born in Topeka, Kans., on February 24, 1891. He attended the University of California (Berkeley) in 1912.

He began his career in 1912, when he became a rodman and chainman for the Southern Pacific Railroad in California. He held various positions until 1923 when he joined the California Division of Highways. From 1923 to 1928 he worked in District I as Office and Resident Engineer, and from 1928 to 1935 he was Office Engineer in District X. He served as District Construction Engineer in District III from 1935 to 1938. Later, while District Construction Engineer in District V, he built Cuesta Grade on Route 101 north of San Luis Obispo. Mr. Booker was Assistant State Highway Engineer from 1952 to 1959.

From 1942 to 1959 he worked in the San Francisco District where he integrated planning and transportation demands in the development of an extensive freeway system. Thirteen hundred miles of state highways were under his charge. He was also responsible for the administration of California's Highway Users' Tax within the District.

He was a member of the Commonwealth and Olympic clubs.

On February 5, 1921, Mr. Booker was married to Leota Provines in Oakland, Calif. He is survived by his widow and a daughter, Barbara (Mrs. Warren Riffel).

He was elected a Member of the Society on November 7, 1949, and a Fellow on June 6, 1959.

GEORGE MAIRS BULL, F. ASCE[11]

Died November 5, 1960

George Mairs Bull, the son of Rice Cook and Catherine (Johnson) Bull, was born in Troy, N. Y., on March 15, 1873. He was graduated from Rensselaer

[10] Abstract of a memoir prepared by Joseph P. Sinclair, F. ASCE, and Lewis A. Weymouth, F. ASCE.

[11] Abstract of a memoir prepared by Clifford A. Betts.

Polytechnic Institute (Troy), in 1897 with a degree in civil engineering. He was awarded an honorary degree of Doctor of Engineering from the Colorado School of Mines (Golden) in 1938, and from the University of Colorado (Boulder), in 1940.

After his graduation he was Assistant Engineer on reconstruction of the old Erie Canal until he enlisted in the First Volunteer Engineers in the Spanish-American War. In 1899 he was with the Chicago Northwestern Railroad and in 1900 became Deputy City Engineer of Troy. He was then Resident Engineer on the New York State Barge Canal (1903 to 1906) and was in charge of the Denver office of J. G. White and Company (1906 to 1909). Mr. Bull opened his own consulting engineering office in Denver in 1909. During World War I, and until 1920, he was a commissioned Lieutenant Commander in the Civil Engineer Corps of the United States Navy. He later returned to Denver to make a study of the city's water supply for the Denver Municipal Water Works. His proposals insured an adequate water supply for Denver for many years. From 1933 to 1940 he was a Federal Director of the Public Works Administration and in 1940 was named Regional Director of the Denver office of Emergency Management.

Mr. Bull was a charter member of the Colorado Society of Engineers.

On June 4, 1910, he was married to Sara E. Baker in Rising Sun, Ind. He is survived by a brother and a sister.

Mr. Bull was elected a Member of the Society on February 2, 1909, and a Fellow on June 6, 1959. He became a Life Member in 1944.

ALLAN LEE CHOLLAR, F. ASCE[12]

Died December 7, 1959

Allan Lee Chollar, the son of Charles Clyde and Leah Ida (de Villeneuve) Chollar, was born in Beaumont, Tex., on May 3, 1904. He attended the Agricultural and Mechanical College of Texas (College Station) from 1923 to 1925, and Rice Institute (Houston) from 1925 to 1927.

He began his career with the County Engineer of Harris County, Tex. In 1928, he accepted a position with the Texas Highway Department; by 1933, he was appointed Resident Engineer at Gatesville; some years later he was made Resident Engineer in charge of the Fort Worth office. In 1930, he served as a Project Engineer and an Assistant Resident Engineer in Waco, Tex., and in 1941, he supervised the plans for the roads and streets in Fort Hood, Tex. During WW II, Mr. Chollar was a Company Commander in the Corps of Engineers. After 1945, he became Supervising Design Engineer in the Road Design Division in Austin. In 1957, he went to work with the Bureau of Public Roads.

Mr. Chollar continued his interest in the reserves and received a certificate of graduation in 1952. He was cleared for "Top Secret" by the United States

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12 Abstract of a memoir prepared by John A. Focht, F. ASCE.

Army and held the rank of Lt. Colonel in the National Guard. Mr. Chollar was a member of the Gatesville Lions Club; the Other of the Elks at Charleston, W. Va.; the Reserve Officers Club; the Texas Public Employees Association; the Texas Society of Professional Engineers; and the N.S.P.E.

On September 11, 1927, Mr. Chollar was married to Mary Claire Derden in Houston, Tex. He is survived by his widow and a daughter, Mary Lou.

Mr. Chollar was elected an Associate Member of the Society on March 20, 1939; a Member on April 30, 1954; and a Fellow on June 6, 1959.

WORTH FANCHER COTTINGHAM, JR. F. ASCE[13]

Died September 14, 1960

Worth Fancher Cottingham, Jr., the son of Worth Fancher and Lillie Dale Dupuy) Cottingham, was born in Corpus Christi, Tex., on June 10, 1911. He was graduated from the University of Texas (Austin) with the degree of Bachelor of Science in architectural engineering in 1932. He earned the degree of Master of Science in architectural engineering in 1941.

After graduation he worked for the Texas Highway Department of Refugio, Beeville, and Mathis as inspector on paving jobs and assisted in the preparation of highway plans. From 1933 to 1935, he was Assistant and Acting City Engineer of Corpus Christi; for five months, in 1935, he was a Junior Engineer with the United States Bureau of Reclamation; from 1935 to 1946, he was Instructor and then Assistant Professor of engineering drawing at the University of Texas, during which time he was also an estimate and design consultant. In 1946, he formed a partnership, Wilson and Cottingham. The structures designed by Mr. Cottingham include many of the important buildings in Austin and the central Texas area.

Mr. Cottingham served as the first Deacon of the University Avenue Church of Christ, and he was its Elder for many years. He was a member of Tau Beta Pi; an active member of the Austin Chamber of Commerce; the American Institute of Architects; the Texas Society of Professional Engineers; the Texas Society of Architects; the American Concrete Institute; and the Construction Specification Institute. His hobbies were photography; fishing; hunting; and water sports.

On November 19, 1932, Mr. Cottingham was married to Lucy Marlow North in Corpus Christi, Tex. He is survived by his widow; a daughter (Mrs. Albert John Agran) and another daughter, Diane.

Mr. Cottingham was elected a Member of the Society on April 7, 1958, and a Fellow on June 6, 1959.

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[13] Abstract of a memoir prepared by John A. Focht, F. ASCE.

ERNEST BUCHANAN CRANE, F. ASCE[14]

Died May 13, 1960

Ernest Buchanan Crane, the son of Charles and Achsah Ann (Marshall) Crane, was born in Dexter, Iowa, on March 15, 1882. He was graduated from the University of Iowa (Iowa City) with a degree in civil engineering in 1904.

He began his professional career at Tacoma, Wash., in 1906 with the Chicago, Milwaukee, St. Paul, and Pacific Railroad Company, as Resident Engineer. He was a principal participant in the planning and construction of the Tacoma Railway Terminals for his company. After the railway construction was completed, he served in various engineering assignments in the northwest for the Milwaukee Railroad until 1918, when he was transferred to Chicago. While in Chicago he was Valuation Engineer for his company until 1920. During this time he was in charge of the valuation survey on the Milwaukee Railroad. Mr. Crane returned to the Pacific Northwest in 1920 and was given the assignment of Assistant Chief Engineer, Western Lines, Milwaukee Railroad, with headquarters at Seattle, Wash. From 1920 until his retirement in 1952, he had charge of all engineering for his company on the western portion of the property.

Mr. Crane was President of the Seattle Section of the Society in 1947; a member of the American Railway Engineering Association; the Engineers Club of Seattle; and the Masonic Order.

He was married to Ruby Patton on April 14, 1909, in Newton, Iowa. He is survived by a brother.

Mr. Crane was elected an Associate Member of the Society on September 2, 1914; a Member on April 8, 1924; and a Fellow on June 6, 1959. He became a Life Member in 1949.

JAMES JOSEPH DOLAND, F. ASCE[15]

Died December 23, 1960

James Joseph Doland, the son of William P. and Catherine (Morgan) Doland, was born in Denver, Colo., on August 1, 1890. He was graduated from the University of Colorado (Boulder) with the degree of Bachelor of Science in civil engineering in 1914. He earned his Master of Science degree from the

14 Abstract of a memoir prepared by John E. Hoving, F. ASCE.
15 Abstract of a memoir prepared by Ven T. Chow, M. ASCE.

University of Illinois (Urbana) in 1932 and was made an Honorary Doctor of Science by St. John's University (Collegeville) in 1944.

During World War I he was a 1st Lieutenant in the Construction Division of the War Department; he held the rank of Captain in the Engineering Corps Reserve. For thirty-two years he was on the faculty of the University of Illinois; he was made a Professor of Hydraulic Engineering Emeritus in 1958. Mr. Doland worked with the Bureau of Reclamation for twelve years; served as consultant to the National Resources Planning Board from 1936 to 1944; was the principal engineer for the United States Engineering Department on several lend-lease bases in 1941; and from 1943 to 1944 he was consultant for the War Production Board. He was President of the Illinois Union Board; Engineer in charge of the University of Illinois Airport; Chairman of the University Senate Committee on Student Affairs; and was on the Board of Trustees of Burnham Hospital in Champaign from 1941 to 1948, serving as its President during the last two years. He is noted, too, for the Cross-Doland method of analysis of flow in water distribution systems. Mr. Doland is fondly remembered as a man of integrity, humanity, and religious faith; as an educator his personal interest in his students encouraged them to work to their fullest capacity.

On April 19, 1917, Mr. Doland was married to Mary Ellen Hoy in St. Paul, Minn. He is survived by his widow.

He was elected an Associate Member of the Society on October 14, 1919; a Member on January 1, 1927; and a Fellow on June 6, 1959.

LE ROY ENGSTROM, F. ASCE[16]

Died December 23, 1960

Le Roy Engstrom, the son of Emil and Anne (Nelson) Engstrom, was born in St. Paul, Minn., on May 16, 1906. He was graduated from the University of Minnesota (Minneapolis) with the degree of Bachelor of Civil Engineering in 1928.

He began his professional career with the Water Resources Branch of the United States Geological Survey, serving in Columbus, Ohio; Boston, Mass.; and Albany, N. Y., where he was engaged in hydrography until 1934. In 1935 he joined the Tennessee Valley Authority as a Junior Hydraulic Engineer in the Engineering Planning and Geology Division, Knoxville, Tenn. Mr. Engstrom then became head of TVA's River and Forecasting Section in 1952; Assistant Chief of the TVA's River Control Branch in 1957; and Chief of that branch in 1958.

He was a member of the TVA Engineers Association; the Technical Society of Knoxville; and the Episcopal Church of the Ascension in Knoxville.

On August 11, 1935, Mr. Engstrom was married to Mary Elizabeth Evans in Beattyville, Ky. He is survived by his widow; a son, John Harvey; a sister; and a brother.

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[16] Abstract of a memoir prepared by Jack W. Hind, M. ASCE.

He was elected a Member of the Society on April 30, 1956, and a Fellow on June 6, 1959.

JOHN MARSHALL EVANS, F. ASCE[17]

Died December 5, 1959

John Marshall Evans, the son of John Walter and Margaret (McLaughlin) Evans, was born in Oakland, Calif., on September 21, 1892. He was graduated from the University of California (Berkeley) with the degree of Bachelor of Science in civil engineering in 1915.

From 1915 until his retirement in 1957, Mr. Evans was associated with the Standard Oil Company of California, except for two years' service as a Captain in the United States Army during World War I. From 1923 to 1927 he worked at the design and construction of giant oil reservoirs for the company, and from 1929 to 1957 he assumed administrative positions. He was Chairman of the Board of Engineers from 1947 to 1954; Chief Engineer from 1947 to 1956; and Assistant Vice-President from 1956 to 1957.

Mr. Evans was President of the San Francisco Engineering Council and the San Francisco Engineers Club; a member of the California Academy of Science; the Commonwealth Club; and the Stock Exchange Club.

On June 6, 1923, he was married to Madeline Thomas Cook in Oakland, Calif. He is survived by his widow; a son, John Marshall, Jr.; and two granddaughters.

Mr. Evans was elected a Junior of the Society on June 6, 1921; an Associate Member on October 21, 1924; a Member on July 12, 1937; and a Fellow on June 6, 1959. He became a Life Member in 1959.

WALTER NETTLETON FRICKSTAD, F. ASCE[18]

Died November 17, 1960

Walter Nettleton Frickstad, the son of Taral Torjesen and Alice (Nettleton) Frickstad, was born in Black Creek, N. Y., on August 17, 1879. He was grad-

17 Abstract of a memoir prepared by Hubert H. Hall, F. ASCE, and Frank B. Cook, F. ASCE.

18 Abstract of a memoir prepared by Frank A. Atwill, Eugene Frickstad, and Emil J. Kaleschke, M. ASCE.

uated from the University of California (Berkeley), with the degree of Bachelor of Science in civil engineering in 1901.

He began his engineering career with the Southern Pacific Company in 1901, and worked for the United States Reclamation Service from 1904 to 1906. During the next year he was an Instructor in civil engineering at the University of California. From 1907 to 1919 Mr. Frickstad was a member of the Engineering Department of the City of Oakland, Calif., and afterwards, during World War I, served as a Captain in the Corps of Engineers. In 1920 he joined the United States Bureau of Public Roads, Ogden, Utah, and from 1923 to 1930 was stationed in San Francisco, Calif. He was then appointed Superintendent of Streets and ex officio City Engineer for Oakland, maintaining this position until his retirement in 1949. He was also active on the Highway Advisory Board of Alameda County, Calif., for ten years.

Mr. Frickstad was a member of the American Public Works Association; the American Philatelic Society; the Commonwealth Club of California; the Masonic Order; and the First Congregational Church of Oakland.

On December 24, 1904, he was married to Louise Clark Walcott in Oakland, Calif. He is survived by two sons, John Walcott and Allen Walter; a daughter, Dorothy Nettleton (Mrs. Don Hassler); two grandchildren; and a brother.

Mr. Frickstad was elected an Associate Member of the Society on June 5, 1907; a Member on August 12, 1920; and a Fellow on June 6, 1959. He became a Life Member in 1942.

ALBERT GIVAN[19]

Died April 1, 1961

Albert Givan, the son of William C. and Mary (Welch) Givan, was born in Terre Haute, Ind., on May 30, 1876. He attended the Rose Polytechnic Institute (Terre Haute) for two years.

In the early years of his career, Mr. Givan worked for the railroads; he did land subdivision including the engineering on streets, sewers, and other public works facilities. Many bridges for Sacramento County and the Carmichael Irrigation District facilities are also his design. He served as City Engineer of Sacramento for five years, and during his tenure he supervised the building of streets; modern wharves; sewerage and drainage works; public buildings; and other facilities. Most outstanding was his design and construction of Sacramento's flood protection system with its by-pass channels; relief weirs; and protective leeves. From 1924 to 1938, while General Manager and Chief Engineer of the Sacramento Municipal Utility District, the Silver Creek project he had planned and promoted was realized. During World War I, Mr. Givan worked on the construction of airplanes.

19 Abstract of a memoir prepared by Edwin A. Fairbairn, F. ASCE.

He organized and served as the first President of the Sacramento Section of the ASCE; held membership in the American Society of Mechanical Engineers; served on the first California Board of Registration of Civil Engineers and was its Secretary for four years. He carried the Civil Engineer Registration No. 1 in his state. In 1959, the Engineering Council of Sacramento Valley honored him for his contributions to the Engineering profession.

On December 2, 1902, Mr. Givan was married to Lillian Dwyer in Wadsworth, Nev. He is survived by his widow; a son, Charles; a daughter, Mary (Mrs. Mary A. Jones); a sister; and a brother.

He was elected an Associate Member of the Society on November 12, 1913; a Member on July 16, 1928; and a Fellow on June 6, 1959.

GEORGE WILLIS HAMLIN, F. ASCE[20]

Died August 5, 1960

George Willis Hamlin, the son of William Gilbert and Elizabeth (Snell) Hamlin, was born in Cleveland, Ohio, on April 2, 1890. He was graduated from Case School of Applied Science (Cleveland), now Case Institute of Technology, with the degree of Bachelor of Science in 1914, and received the degree of Civil Engineer from it in 1920.

Upon his graduation in 1914, Mr. Hamlin joined the Department of Public Utilities of Cleveland, and except for one year (1915 to 1916) with the American Steel and Wire Company, he remained there until his retirement in 1959. He began as a Field Engineer, and was then Engineer of Design and Engineer of Construction. From 1940 to 1953 he was Acting Commissioner of Water and Heat and in 1942 was Acting Director of Public Utilities. He became Acting Commissioner of Utilities Engineering in 1953. While in this position, he supervised additions to Cleveland's municipally-owned electrical utility system and sewage disposal system.

Mr. Hamlin was a former President of the Cleveland Section of the Society; a member of the National Society of Professional Engineers; the American Water Works Association; and the Cleveland Engineering Society.

On August 12, 1916, he was married to Adelaide Dorsey in Cleveland, Ohio. He is survived by his widow; two sons, William and John; a sister; and four grandchildren.

Mr. Hamlin was elected an Associate Member of the Society on January 17, 1921; a Member on March 5, 1928; and a Fellow on June 6, 1959. He became a Life Member in 1956.

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[20] Abstract of a memoir prepared by Carl A. Carlson, M. ASCE.

DITLEF RAEDER HETTELSATER, F. ASCE[21]

Died December 12, 1960

Ditlef Raeder Hettelsater, the son of Christian and Elise (Raeder) Hettelsater, was born in Norway, on March 24, 1885.

He began his career with the American Bridge Company (1902 to 1905), and was then employed as a Structural Engineer by J. T. Ryerson and Son (1907 to 1909) and the Lackawanna Bridge Company (1916 to 1918). Later, he was Construction and Contracting Engineer with the Dravo Contracting Company (1918 to 1922); V. D. Simons, Inc. (1925 to 1927); and the Folwell Engineering Company (1927 to 1932). From 1932 to 1940 he was Construction Engineer with the Freyn Engineering Co. (Chicago); and from 1940 until his death he was Structural Engineer with the Jones-Hettelsater Construction Company, Kansas City, Mo.

Mr. Hettelsater was a trustee of the Roanoke Methodist Church of Kansas City; a member of the National Society of Professional Engineers; and the Missouri Society of Professional Engineers.

On May 11, 1909, he was married to Ella Watts in Springfield, Ill. He is survived by his widow; a son, Richard; two daughters, Ellen (Mrs. Dudley Nicholls) and Madeline (Mrs. William Hite); seven grandchildren; and one great-granddaughter.

Mr. Hettelsater was elected a Member of the Society on October 20, 1947, and a Fellow on June 6, 1959.

ROBERT HOWES, M. ASCE[22]

Died January 30, 1958

Robert Howes, the son of Calvin Clark and Sarah Freeman (Hall) Howes, was born in Dennis, Mass., on July 29, 1875. He was graduated with the degree of Bachelor of Science in electrical engineering from the Brooklyn Polytechnic Institute (New York) in 1897, and with the degree of Mechanical Engineer from Cornell University (Ithaca), in 1898.

For a year following his graduation, he served as Inspector and Foreman for the Metropolitan State Railway Company of New York City. In 1899 he entered the employ of the Washington Water Power Company of Spokane, as Engineer

21 Abstract of a memoir prepared by G. H. Kevan, M. ASCE.
22 Abstract of a memoir prepared by Samuel DeMoss, F. ASCE.

and First Assistant Superintendent of the light and power system. From 1905 to 1907 he was Hydraulic and Electronic Engineer for the Great Northern Development Company of Duluth, Minn., and in 1907 he was with J. C. White and Company, New York, on hydraulic construction of the Connecticut River in Vermont. Mr. Howes returned to the west in 1908, working on construction of 64 miles of high speed interurban electric railway for the British Columbia Electric Company of Vancouver. From 1910 until his death, except for a year with the United States Housing Corporation, he was engaged in private consulting practice in Seattle, Wash.

Mr. Howes was a member of the Seattle Rotary Club; the Masonic Order; and was a charter member of the Washington Athletic Club.

He was married to Ann Gertrude Merrihew in Brooklyn, N. Y., on February 10, 1902. He is survived by a brother.

Mr. Howes was elected a Member of the Society on January 2, 1912, and became a Life Member in 1946.

MARTIN RICHARD HUBERTY, F. ASCE[23]

Died December 12, 1960

Martin Richard Huberty, the son of August and Mary Ann (Donnallon) Huberty, was born in San Andreas, Calif., on May 16, 1894. He was graduated from the University of California (Berkeley) in 1920, with the degree of Bachelor of Science in agriculture. In 1934 he obtained the degree of Engineer from Stanford University (Stanford).

After serving as a Sergeant in the United States Army during World War I, he joined the staff of the Irrigation Division, College of Agriculture, at the University of California; he rose to the position of Professor of Irrigation and Soil Science. In 1953 Mr. Huberty was appointed to the faculty of the College of Engineering of the University of California (Los Angeles). In addition he served as Consultant to the United States Bureau of Reclamation; the Federal Emergency Relief Administration; the United States Geological Survey; and the United Nations.

Mr. Huberty was a Fellow of the American Association for the Advancement of Science; and a member of the American Society of Agricultural Engineers; the Soil Science Society of America; the American Geophysical Union; and the Western Soil Science Society.

On July 5, 1930, he was married to Gertrude Turner in Berkeley, Calif. He is survived by his widow; two sons, Richard August and Frederick Turner; three daughters, Mary Ann (Mrs. John Bruce Duncan), Alice Turner, and Elizabeth Lee; two grandchildren; a sister; and two brothers.

Mr. Huberty was elected an Associate Member of the Society on October 17, 1938; a Member on February 2, 1959; and a Fellow on June 6, 1959.

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[23] Abstract of a memoir prepared by C. Martin Duke, F. ASCE.

RICHARD WILLIAMSON JONES, F. ASCE[24]

Died November 28, 1959

Richard Williamson Jones, the son of Herman and Ann (Williamson) Jones, was born in Boise, Idaho, on October 30, 1906. He was graduated from the University of California (Berkeley) with the degree of Bachelor of Science in 1933.

From 1933 to 1935 he was with the Transbay Construction Company as Field Engineer and Construction Superintendent on the foundations of the San Francisco-Oakland Bay Bridge, Calif., and from 1935 to 1937 served as Chief Field Engineer for that company in charge of all surveys. He was employed by the General Shay Columbia Company on construction of the first stage of Ross Dam on the Skagit River, Wash., a unit of the Seattle (Wash.) City Light and Power system in 1937. In 1938 Mr. Jones was engaged on the construction of dry rock No. 4 at Puget Sound Naval Station, Bremerton, Wash., and from 1940 to 1941 was employed by the J. A. McEachern Company as Officer Engineer covering design of bulkheads; docks; craneways; shipways; and building foundations at Seattle and Tacoma, Wash. From 1941 until his death he served with the General Construction Company, Seattle, in various capacities including General Superintendent on the construction of two ocean terminals; Construction Project Engineer on the second stage of Ross Dam; Estimator on major projects in the company's office; and Chief Field Engineer on Hungry Horse Dam in western Montana. Mr. Jones was President of the company from 1947 to 1950.

He was married to Kathie Ann Kramer on June 20, 1946, in San Francisco, Calif. He is survived by his widow; a sister; and a brother.

Mr. Jones was elected a Member of the Society on April 4, 1949, and a Fellow on June 6, 1959.

ADOLF HEINRICH KOEBIG, Jr., M. ASCE[25]

Died April 30, 1960

Adolf Heinrich Koebig, Jr., the son of Adolf Heinrich and Helene (Kieffer) Koebig, was born in San Bernardino, Calif., on August 5, 1886. He attended Amherst College (Amherst), and Stanford University (Stanford).

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24 Abstract of a memoir prepared by Samuel DeMoss, F. ASCE.
25 Abstract of a memoir prepared by Raymond D. Spencer, F. ASCE.

In 1906 he joined his father's engineering business in Los Angeles, Calif., and became a full partner in 1911 under the firm name of Koebig and Koebig. After its incorporation in 1948, Mr. Koebig served as President and Chairman of the Board of Directors until his death. He was a pioneer in the field of modern sewage treatment and an authority in the design of water works and irrigation systems. The firm's projects included a flood control program for Los Angeles County; facilities for Vandenberg Air Force Base, Lompoc, Calif.; and a harbor for the City of Rodondo Beach, Calif.

Mr. Koebig was a member of the American Water Works Association; the American Arbitration Association; the Consulting Engineers Association of California; the Los Angeles Chamber of Commerce; and the Masonic Order.

In 1912, he was married to Gladys Felt in Los Angeles, Calif. After her death he was married to Ida Ruth Goakes on June 30, 1950, in Yuma, Ariz. He is survived by his widow and a brother.

Mr. Koebig was elected an Associate Member of the Society on March 28, 1932, and a Member on June 6, 1959. He became a Life Member in 1957.

CHARLES TILESTON LEEDS, F. ASCE[26]

Died March 20, 1960

Charles Tileston Leeds, the son of Benjamin Ingersoll and Martha Knapp (Huse) Leeds, was born in Newton, Mass., on May 14, 1879. He was graduated from the United States Military Academy (West Point) in 1903, and from Massachusetts Institute of Technology (Cambridge) with the degree of Bachelor of Science in 1906.

The early years of his career were spent with the Corps of Engineers, United States Army, in the Philippines and in the western United States. From 1917 to 1919 he served as District Engineer at Los Angeles, Calif. Mr. Leeds maintained a private practice at Los Angeles; he became a partner of Leeds and Barnard in 1912; of Quinton Code and Hill - Leeds and Barnard in 1930; of Leeds, Hill, Barnard, and Jewett in 1940; and of Leeds, Hill and Jewett in 1946. In addition, he served as consultant on projects for water supply development and flood control works in southern California.

Mr. Leeds was a former President of the Los Angeles Section of the Society; a former Director of the Society; a member of the American Geophysical Union; and of the Society of American Military Engineers.

On January 12, 1905, he was married to Amy Lee Shapleigh in Newton (Mass.). He is survived by his widow; a son, Charles Tileston, Jr.; three daughters, Alice Shapleigh (Mrs. Edward H. Hunting), Eleanor Huse (Mrs. Warren E. Fenzi), and Elizabeth Chandler (Mrs. DeSaix B. Myers, Jr.); and fourteen grandchildren.

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[26] Abstract of a memoir prepared by John Q. Jewett, F. ASCE.

Mr. Leeds was elected a Junior Member of the Society on January 3, 1907; an Associate Member on April 4, 1911; a Member on September 3, 1913; and a Fellow on June 6, 1959. He became a Life Member in 1946.

HAROLD WARE LIPPINCOTT, M. ASCE[27]

Died April 1, 1961

Harold Ware Lippincott, the son of Warren Bird and Kittie (Olmsted) Lippincott, was born in Kansas City, Mo., on March 15, 1902. He attended the Colorado School of Mines (Golden).

Mr. Lippincott began his professional career as a chainman with the Missouri Highway Department. From 1925 to 1929 he was the representative of consulting engineers on municipal construction. From 1936 to 1940 he was Research Engineer Inspector with the PWA. He also worked as a Water and Sewage Engineer for several years. Following the depression in the thirties, he joined Stone and Webster Corporation as Construction Superintendent. In 1959, his increased responsibility took him to Boston, where he helped to guide younger men assigned to field jobs.

When time permitted, Mr. Lippincott enjoyed his hobby, music.

In 1928, Mr. Lippincott married Felicia Williams. He is survived by his widow and a sister.

He was elected an Associate Member of the Society on November 19, 1945, and a Member on June 6, 1959.

JOHN STALKER LONGWELL, F. ASCE[28]

Died March 25, 1960

John Stalker Longwell, the son of Oliver H. and Mary (Stalker) Longwell, was born in Shenandoah, Iowa, on December 13, 1887. He was graduated from Highland Park College (Des Moines) in 1908 with the degree of Bachelor of Science in engineering, and from Cornell University (Ithaca) in 1910 with a degree in civil engineering.

Upon his graduation, Mr. Longwell worked on several projects for the United States Reclamation Service, including the construction of the Shoshone Hydro-

[27] Abstract of a memoir prepared by C. R. Van Orman, F. ASCE.
[28] Abstract of a memoir prepared by Robert C. Kennedy, F. ASCE.

electric Plant, Wyoming, in 1922. In 1924 he joined the East Bay Municipal Utility District in Oakland, Calif., as Division Engineer on the East Bay Aqueduct. He became Assistant Chief Engineer and Assistant General Manager in 1929, and was Chief Engineer and General Manager of the District from 1934 until his retirement in 1949. From that time until his death, he maintained a consulting office in Oakland. In addition, he served as consultant for many water control organizations, including the San Francisco Bay Area Water Pollution Control Board (1949 to 1958).

Mr. Longwell was President of the San Francisco Section of the Society in 1952; a member of the AWWA, the East Bay Engineers' Club; and Sigma Xi.

On July 16, 1917, he was married to Martha Dorothea Ploeger in Salt Lake City, Utah. He is survived by his widow; two sons, John Ploeger and Robert Stalker; a daughter, Barbara Louise (Mrs. David Hurst Thomas); and seven grandchildren.

Mr. Longwell was elected a Junior of the Society on October 3, 1911; an Associate Member on May 12, 1919; a Member on October 14, 1929; and a Fellow on June 6, 1959. He became a Life Member in 1954.

ROSS L'ESTRANGE MAHON, F. ASCE[29]

Died September 13, 1960

Ross L'Estrange Mahon, the son of William L'Estrange and Harriet (Ailes) Mahon, was born in Detroit, Mich., on April 16, 1890. He was graduated from the University of Michigan (Ann Arbor) with the degree of Bachelor of Science in engineering in 1912.

During World War I he served as Captain in France and Belgium, and during World War II was a Major in the United States Engineer Corps. He held responsible positions at Fort Ord, Calif., and Fort Lewis, Wash. He retired in 1950 with the rank of Colonel.

In 1919 Mr. Mahon became associated with the Pelton Water Wheel Company, San Francisco, Calif., and was its Vice-President and General Manager from 1928 to 1931. Afterwards, until 1940, he was engaged in sales engineering practices for the Soule Steel Company, San Francisco. From 1945 to 1955 he was Pacific Coast representative of the S. Morgan Smith Company of York, Pa., with his headquarters in San Francisco. He specialized in the design of large hydraulic valves.

On June 9, 1917, Mr. Mahon was married to Phyllis Fay Woodward in Berkeley, Calif. He is survived by his widow; a daughter, Phyllis (Mrs. Joseph Hilton Wadworth, Jr.); and three grandchildren.

He was elected a Member of the Society on November 9, 1936, and a Fellow on June 6, 1959.

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29 Abstract of a memoir prepared by Frank E. Bonner, F. ASCE.

CHARLES MANNEL, F. ASCE[30]

Died April 3, 1960

Charles Mannel, the son of Anton and Johanna Mannel, was born in Brooklyn, N. Y., on January 13, 1888. He attended The Cooper Union (New York), in 1907, and was graduated from the Polytechnic Institute of Brooklyn (New York) with a degree in civil engineering in 1911.

Upon his graduation, Mr. Mannel was an instrumentman and inspector for the Central Railroad of New Jersey, and from 1913 to 1920 he was Field Engineer; Superintendent; and Vice-President on the construction of elevated railways for the Cooper Evans Company; later W. G. Cooper, Inc., New York City. He was also a Field Engineer for the Biltmore Forest Company, Asheville, N. C. (1920); an Office Engineer for the North Carolina State Highway Commission (1921); and an Engineer and Superintendent for the Allport Construction Company of Asheville (1922). In 1924 he joined the Biltmore Concrete Company of Asheville as Engineer; Superintendent; and Secretary-Treasurer. In 1933 he became a Field Engineer on the construction of a storage dam for the Civil Works Administration. After working for a consulting engineer in Asheville, he joined the Morrison-Knudsen Company as Assistant Engineer on large earth-filled dam installations (1940), and Six Associates, Inc., of Asheville, as Assistant Engineer on the design and construction of regional projects (1942).

Mr. Mannel was a 32nd degree Mason; a Shriner; and a member of the North Carolina Society of Professional Engineers.

In 1917 he was married to Clara Hendricks, who passed away in 1922. He was married again to Mary Ford Miller on October 2, 1946, in Houston, Tex. He is survived by his widow, and a sister.

Mr. Mannel was elected a Member of the Society on July 11, 1938, and a Fellow on June 6, 1959.

JOHN LESLIE MASON, F. ASCE[31]

Died February 23, 1960

John Leslie Mason, the son of Albert and Elizabeth (Burton) Mason, was born in Mt. Morris, Ill., on June 2, 1897. He was graduated from the Univer-

[30] Abstract of a memoir prepared by Thomas A. Cox, Jr., M. ASCE, and Robert H. Nagel, M. ASCE.

[31] Abstract of a memoir prepared by Miss Mary Rose Mason.

sity of California (Berkeley) with the degree of Bachelor of Science in civil engineering in 1925.

After six years of sales and research experience, Mr. Mason was a self-employed consulting engineer specializing in prestressed concrete (1931 to 1941), concurrently serving as Resident Engineer Inspector with the Public Works Administration for Bridge and Harbor Works in Oakland, Calif., and later as Assistant City Engineer for Modesto, Calif., (1938 to 1941). From 1946 to 1951 he was District Manager and Engineer of the Central Contra Costa Sanitary District, Walnut Creek, Calif.

Mr. Mason was a veteran of World War I and served in the Civil Engineer Corps of the United States Navy during World War II. From 1952 to 1958 he served as Civil Engineer Advisor, United States Naval Mission to Venezuela. After retiring from the Navy in 1958, he was appointed head of the Industrial and Facilities Branch of the Naval Inspector of Ordnance office in Sunnyvale, Calif.

He was a member of the Masonic Order; the Rotary Club; and Chi Epsilon.

On June 28, 1919, Mr. Mason was married to Grace Winifred Moran in Exeter, Calif. He is survived by his widow; a daughter, Mary Rose; a sister; and six brothers.

He was elected an Associate Member of the Society on June 9, 1930; a Member on December 10, 1941; and a Fellow on June 6, 1959.

JAMES ERDIS ALLEN McDONALD, M. ASCE[32]

Died October 12, 1960

James Erdis Allen McDonald, the son of Joseph and Katherine (Parks) McDonald, was born in Knoxville, Tenn., on December 4, 1904. He was registered to practice engineering in Tennessee in 1943.

He held various positions, including those of rodman and instrumentman, before entering private engineering practice in Knoxville in 1944. He maintained this firm, known as James E. McDonald Company, Engineers, until his death. In 1952 Mr. McDonald was engaged by the City of Knoxville to do the complete stake-out for the Knoxville sewage disposal plant, and from 1952 to 1955 he was Chairman of the Planning Commission for the City of Knoxville. He also helped set up the West Knox Utility District and the Northeast Knox Utility District; he served the two districts as consultant until his death. In addition, he designed and supervised the construction of airports for Morristown, Tenn. (1952), and Rockwood, Tenn. (1953), while doing airport design for the Tennessee Aeronautics Commission (1952 to 1960).

Mr. McDonald was President of the Tennessee Section of the National Society of Professional Engineers in 1950; and a member of the American Water

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[32] Abstract of a memoir prepared by Mrs. James E. McDonald.

Works Association; the American Congress on Surveying and Mapping; and the Masonic Order.

On August 18, 1928, he was married to Lucie Yadon in Knoxville, Tenn. He is survived by his widow; his mother; two sisters; and two brothers.

Mr. McDonald was elected an Associate Member of the Society on July 10, 1944, and a Member on June 6, 1959.

WILLIAM HENRY MEAD, F. ASCE[33]

Died July 22, 1960

William Henry Mead, the son of Albert Winslow and Lillian (Chapin) Mead, was born in Hinsdale, N. H., on September 6, 1886. He was graduated from the Sheffield Scientific School of Yale University (New Haven), with the degree of Bachelor of Science in 1909.

From 1910 to 1913 he was Field Engineer for the Texas Pipeline Company, Houston, and from 1913 to 1921 was Chief Engineer for the Production Department of the Company. He was employed by Hogg Brothers, Houston, in 1921, and by the American Petroleum Company, Houston, from 1924 to 1927. In 1928 Mr. Mead became General Manager of the Texas Prison System at Huntsville, Tex., and from 1929 to 1930 was a Texas Ranger. He was Superintendent of the Salt Flat Water Company, Luling, Tex. (1929 to 1942), which aided in the disposal of the salt water produced in the oil fields of Luling and Darst Creek. In 1942 he was Supervising Engineer for the Trans-Florida Pipeline Company, Tallahassee, Fla., and from 1943 to 1946 was with the War Emergency Pipeline. From 1948 until his retirement in 1951 he was Manager of the Darst (Texas) Salt Water Company.

Mr. Mead was President of the Luling Chamber of Commerce; a member of the Kiwanis Club; and an active supporter of the Boy Scouts of America.

He was married to Anar Whitten on October 6, 1914, in West Haven, Conn. He is survived by his widow; and two daughters, Martha (Mrs. Jefferson Lee Horn) and Eleanor (Mrs. Searcy C. Glass, Jr.).

Mr. Mean was elected an Associate Member of the Society on October 9, 1917; a Member on February 19, 1934; and a Fellow on June 6, 1959. He became a Life Member in 1952.

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33 Abstract of a memoir prepared by John A. Focht, F. ASCE.

PHILLIP FAIRBANKS MORGAN, F. ASCE[34]

Died January 19, 1961

Phillip Fairbanks Morgan, the son of Chester P. and Edith (Fairbanks) Morgan, was born in Evansville, Wis., on June 19, 1911. He was graduated from the University of Wisconsin (Madison) with the degree of Bachelor of Science in civil engineering in 1933. He earned a Master of Science degree in sanitary engineering in 1935.

In 1945, after some practical engineering experience, he joined the Mellon Institute for Industrial Research at Kalamazoo, Mich., where he became a Fellow on the National Council for Stream Improvement. He became an Associate Professor at the University of Iowa (Iowa City) in 1948 and a full Professor in 1952. There he developed an excellent research program and laboratory facilities. He won the Rodebaugh award in 1950 and 1955; the ASCE research award for 1956; and the American Water Works Association Fuller award, Iowa Section, in 1959.

He served on the City Council from 1956 to 1959; was Mayor in 1959; and was on the Board of Athletics and the University Committee on Lectures and Vespers. He held membership in the American Association of University Professors; Iowa Sewage Works Association; American Society for Engineering Education; Central States Sewage Works Association; Iowa Engineering Society; Iowa City Rotary Club; Sigma Xi; Chi Epsilon; and Tau Beta Pi. He was President of the Iowa Sections of the ASCE in 1953; of the Iowa City Engineers Club in 1949; of the American Water Works Association in 1953; and of the Triangle Club in 1961.

On December 5, 1936, Mr. Morgan was married to Olive Johnson in Chicago, Ill. He is survived by his widow; his mother; a son, Paul; a daughter, Nedra; and a sister.

He was elected an Associate Member of the Society on July 10, 1944; a Member on June 23, 1952; and a Fellow on June 6, 1959.

ELMO NEIL MURPHY, M. ASCE[35]

Died February 19, 1961

Elmo Neil Murphy, the son of John James and Elizabeth (Taggert) Murphy, was born in Wheatland, Calif., on June 11, 1888. He was graduated from the

34 Abstract of a memoir prepared by J. W. Howe, F. ASCE.
35 Abstract of a memoir prepared by Thornton J. Corwin, Jr., F. ASCE.

University of California (Berkeley), with the degree of Bachelor of Science in civil engineering in 1912.

Following his graduation, Mr. Murphy was employed by the Pacific Gas and Electric Company. He served in World War I as a Lieutenant in the Corps of Engineers. At the end of the war, he returned to the company as a Resident Engineer on the construction of hydroelectric plants. Subsequently, as a Design Engineer, he was instrumental in solving the problems of the transitional designs of hydroelectric plants as well as those involving the conveyance of water. Returning to the field, he supervised the installations of natural gas lines. During World War II, and up to the time of his retirement on July 1, 1953, he was engaged in the design of hydroelectric plants and the improvements and maintenance of dams and waterways.

Mr. Murphy was a Deacon of Lakeside Presbyterian Church; a Past Master of Mt. Davidson Lodge No. 481, Free and Accepted Masons; and Past Patron, Order of the Eastern Star. He was a member of the Olympic Club and its Glee Club. His hobbies were photography and travel.

On June 25, 1925, Mr. Murphy was married to Edith McNab in San Francisco, Calif. He is survived by his widow and a brother. He was elected an Associate Member of the Society on September 12, 1921, and a Member on June 6, 1959. He became a Life Member in 1956.

GEORGE FRANCIS NICHOLSON, F. ASCE[36]

Died August 25, 1960

George Francis Nicholson, the son of William and Katherine (Honour) Nicholson, was born in Terre Haute, Ind., on October 10, 1883. He was graduated from Rose Polytechnic Institute (Terre Haute) with the degree of Bachelor of Science in 1906 and the degree of Civil Engineer in 1920.

After graduation he was an instrumentman and topographer with the Mexican Central Railroad and then was a member of the engineering staff of the Seattle (Wash.) Municipal Plans Commission. From 1911 to 1913 he was engaged in harbor planning with Virgil G. Bogue, and from 1913 to 1916 was Construction Engineer for the Port of Seattle; he was Chief Engineer of that port until 1925. Mr. Nicholson was then Harbor Engineer for the Port of Los Angeles, Calif. (1925 to 1933) and was in private practice and consultant to the city of Long Beach, Calif., on tideland matters (1933 to 1939). During World War II he did waterfront work as a Commander in the United States Navy, and following that, was a Consulting Engineer in Long Beach.

Mr. Nicholson was a member of the American Association of Port Authorities and the Pacific Coast Association of Port Authorities.

In April, 1914, he was married to Fayelle Caroline Fisbeck in Seattle, Wash. After her death he was married to Enola Cossart in November, 1930, in Los

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[36] Abstract of a memoir prepared by J. W. B. Blackman, F. ASCE.

Angeles, Calif. He is survived by his widow; two sons, Donald and Norman; a daughter, Dorothy (Mrs. Rex Rosenburger); and a sister.

Mr. Nicholson was elected an Associate Member of the Society on May 15, 1917; a Member on July 6, 1920; and a Fellow on June 6, 1959. He became a Life Member in 1952.

JOHN HENRY OBERMULLER, M. ASCE[37]

Died September 14, 1959

John Henry Obermuller, the son of John A. and Margaret (O'Neill) Obermuller, was born in Hayward, Calif., on April 23, 1885. He completed an International Correspondence Course in civil engineering.

He began his engineering career by working on the location of the Western Pacific Railroad through the Feather River Canyon in California. He was then Resident Engineer on the Grand Trunk Pacific Railroad in Canada for seven years. Afterwards, he was Assistant City Engineer for San Francisco on the Hetch Hetchy Project and then worked with the Bureau of Public Roads for ten years. From 1928 until his retirement in 1955, he was engaged in planning and design work for the California State Division of Highways as Assistant Planning Engineer. During his service on highways, he had an active and responsible part in the development and expansion of the California organization to its present size.

Mr. Obermuller was a President of the Sacramento Section of the Society.

On July 21, 1915, he was married to Julia E. Church in Petaluma, Calif. He is survived by his widow; a son, John C.; and four grandchildren.

Mr. Obermuller was elected an Associate Member of the Society on March 11, 1929, and a Member on June 6, 1959. He became a Life Member in 1956.

ISAAC OESTERBLOM, F. ASCE[38]

Died July 1, 1960

Isaac Oesterblom, the son of Lars Johann and Ida (Gummeson) Oesterblom, was born in Wormsoe, Estonia, on July 22, 1877. He was graduated from Mal-

37 Abstract of a memoir prepared by Ridgway M. Gillis, F. ASCE.

38 Abstract of a memoir prepared by Thomas A. Cox, Jr., M. ASCE, and Robert H. Nagel, M. ASCE.

moe Polytechnic Institute (Sweden) with the degree of Mechanical Engineer in 1902.

He began his career as Inspector of Construction and Engineer for the Westchester Lighting Company of the Brooklyn Edison Company, New York. Later he was Engineering Manager of the Truscon Steel Company for China and India (1912 to 1928); Chief Engineer of the railway department of the Fairbanks Morse Company (1929 to 1931); Assistant Director for the State of Illinois of the Works Progress Administration (1935 to 1939); and Engineer with the Carbide and Carbon Chemicals Corporation, Charleston, W. Va. (1940 to 1954). During his professional career, Mr. Oesterblom was Engineer in Charge of Construction of many buildings in the United States; Cuba; China; India; Ceylon; and Malaya.

He was a member of the American Association of Engineers; the Engineering Society of China; the American Society of Swedish Engineers; and the Bombay (India) Engineering Congress.

On January 15, 1906, Mr. Oesterblom was married to Annie E. Nesbitt in New York, N.Y. After her death he was married to Cora Agnes Lane on February 14, 1927. He is survived by his widow; a daughter, Margaret Ida (Mrs. Gerald Sebastian Pell); four sisters; and a brother.

He was elected a Member of the Society on November 21, 1921, and a Fellow on June 6, 1959. He became a Life Member in 1948.

WAYNE ARTHUR PERKINS, M. ASCE[39]

Died May 20, 1959

Wayne Arthur Perkins, the son of Charles William and Mary (Sanborn) Perkins, was born in Newmarket, N.H., on February 18, 1881. He was graduated from Dartmouth College (Hanover) with the degree of Bachelor of Science in civil engineering in 1904.

He began his career with the United States Reclamation Service in 1905, in Roosevelt, Ariz., and remained with it, on various projects, until 1909. From 1909 to 1911 he surveyed and planned irrigation projects for Bull and Witham, Engineers, of Denver, Colo. In 1911 Mr. Perkins returned to the Reclamation Service and worked on the design and construction of Two Medicine Lake Dam, Montana; Clear Creek Dam, Yakima, Wash.; and Percha Diversion Dam on the Rio Grande, Texas. He was then engaged in surveying and construction for the Nevada Highway Department from 1919 to 1921, when he entered the employ of the State of California. He worked here until his retirement in 1949, principally as a specialist in dam design and construction in the activity of state review and regulation for public safety of dam construction and maintenance.

Mr. Perkins was an active member of the Unitarian Church.

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[39] Abstract of a memoir prepared by Walter A. Brown, M. ASCE.

On August 29, 1906, he was married to Mary Pierce Chapman in Newmarket, N. H. He is survived by his widow; two sons, Sumner E. and Erlon C.; a daughter, Barbara (Mrs. Charles W. Cleary, Jr.); four grandchildren; and a great-grandchild.

Mr. Perkins was elected an Associate Member of the Society on October 1, 1926, and a Member on March 10, 1930. He became a Life Member in 1952.

CARL DeFORREST POLLOCK, F. ASCE[40]

Died December 14, 1959

Carl DeForrest Pollock, the son of John Mitchell and Flora May (DeForrest) Pollock, was born in Greeley, Colo., on September 16, 1885. He was graduated from the University of Washington (Seattle) in 1911 with the degree of Bachelor of Science in engineering.

After preliminary training in his career, he was in charge of engineering work for the Alaska Engineering Commission from 1916 to 1924. For the next eight years Mr. Pollock did consulting work in Seattle, except when he served as Chief Engineer for Associated Central Business Properties in 1927 and for the Seattle Traffic Research Commission in 1928. From 1932 to 1936 he was Assistant Chief Engineer for the Washington State Department of Public Service, and from 1936 to 1938 he was Assistant Chief Engineer for the Public Service Commission in West Virginia. During World War II he served as Chief Engineer for the United States Army Engineers in British Columbia and Alaska. In 1946, he formed the Carl D. Pollock Company, Consulting Engineers, in Seattle, and from 1952 to 1958 was with the United States Army Engineers in Seattle.

He was a member of the Society of American Military Engineers; the Masonic Order; and the Westminster Presbyterian Church in Seattle.

On January 1, 1913, Mr. Pollock was married to Hazel Bell Elsey in Seattle, Wash. He is survived by his widow; a son, Robert DeForrest; and a daughter, Marion Frances.

He was elected an Associate Member of the Society on March 12, 1923; a Member on October 12, 1925; and a Fellow on June 6, 1959. He became a Life Member in 1956.

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[40] Abstract of a memoir prepared by Albert L. Hoag, M. ASCE.

VILAS RICHARD RATHBUN, M. ASCE[41]

Died February 24, 1958

Vilas Richard Rathbun, the son of John and Elizabeth (Goldenberger) Rathbun, was born in Midland, Tex., on September 25, 1886. He was graduated from the University of Washington (Seattle) with the degree of Bachelor of Science in civil engineering in 1911.

From 1912 to 1915 he served as Engineer for the Pacific Coast Steamship and Pacific Coast Railroad Companies and from 1915 to 1917 was in the employ of the Southern Pacific Railway as Hydraulic and Railroad Design Engineer. He served in the United States Army Engineer Corps during World War I and was employed in various types of engineering work from 1919 to 1925. While with the Public Utilities Department of the City of Tacoma, Wash. (1925 to 1933), he served as Design Engineer on the Cushman Power Project. Mr. Rathbun was in charge of utility appraisals for the Department of Public Service, State of Washington, from 1933 to 1935. For the next five years he was Works Progress Administration Principal Engineer for the State of Washington, and from 1940 to 1943 was Coordinating Engineer for the Sims Company, Puget Sound, Wash., on naval contracts. He then served as Structural Engineer at Seattle for the Bureau of Yards and Docks, United States Navy (1943 to 1946). From 1948 until his retirement in 1951, he was Construction Engineer for Carey and Kramer, Seattle.

Mr. Rathbun was a member of professional and civic groups, including the American Legion and the Masonic Order.

On June 15, 1913, he was married to Olive Winsor in Seattle, Wash. After her death he was married to Bernice Cales in Seattle on September 23, 1949. He is survived by a brother.

Mr. Rathbun was elected an Associate Member of the Society on December 5, 1927, and a Member on April 22, 1929. He became a Life Member in 1957.

GEORGE PERCY SEELEY, M. ASCE[42]

Died November 27, 1960

George Percy Seeley, the son of George Percy and Ellen (Keim) Seeley, was born in Philadelphia, Pa., on April 2, 1886. He was graduated from Princeton University (N. J.) in 1909 with the degree of Civil Engineer.

41 Abstract of a memoir prepared by John E. Hoving, F. ASCE.
42 Abstract of a memoir prepared by George P. Seeley, Jr., M. ASCE.

After his graduation he joined the Frederick Snare Corporation of New York City, an international engineering and construction concern, and remained with them until his death. His first assignment for the company was as Manager of its headquarters in Cuba. Mr. Seeley was instrumental in the construction of several South American ports, including those of Callao, Peru, and La Guaira, Venezuela. In this country he assisted in the construction of the Triborough, Whitestone, and Chesapeake Bay Bridges, among others. During World War I he served as a pilot with the Royal Canadian Flying Corps. From 1948 to 1958 he was President of the Frederick Snare Corporation, and at the time of his death was Assistant to the Chairman of the Board of Directors.

Mr. Seeley was a member of the Havana (Cuba) Country Club; the University Club of New York; the Englewood (N.J.) Club; and India House.

On March 7, 1926, he was married to Rosa Deschapelles in Havana, Cuba. He is survived by his widow; two sons, George Percy, Jr., and Frederick; two daughters, Rosita (Mrs. Jack Morgan) and Juanita (Mrs. Mitchell Carey); a brother; and eleven grandchildren.

Mr. Seeley was elected an Associate Member of the Society on June 1, 1920, and a Member on June 6, 1959. He became a Life Member in 1955.

EDWARD CLAYTON SHERMAN, F. ASCE[43]

Died February 28, 1961

Edward Clayton Sherman, the son of Eben and Lucy (Burgess) Sherman, was born in Kingston, Mass., on January 11, 1877. He was graduated from the Massachusetts Institute of Technology (Cambridge) in 1898 with the degree of Bachelor of Science in civil engineering.

In 1900 he became Assistant Engineer with the Cambridge Bridge Commission; in 1903 he joined the Charles River Basin Commission, Boston, Mass., as Assistant Engineer, and later was Division Engineer. From 1909 to 1912 Mr. Sherman was a Designing Engineer with the Isthmian Canal Commission and was in charge of the designs of the Gatun and Miraflores spillway dams at Culebra, Canal Zone. He then entered private engineering practice and served as Consulting Engineer to the Merrimac Valley Waterways Board. From 1917 until his retirement in 1936 he was Project Manager in the Bureau of Yards and Docks, Navy Department, in Washington, D.C. In this office, he was in charge of designs for radio stations; fuel storage plants; Marine Corps buildings; water supplies; and other projects.

Mr. Sherman was a member of the Cosmos Club, Washington, D.C.

He was married to Katharine Buck on September 11, 1907, in Bramwell, W. Va. He is survived by a son, Edward Clayton, Jr.; a daughter, Theda (Mrs. John Wigton Newlin); seven grandchildren; and three great-grandchildren.

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[43] Abstract of a memoir prepared by Mrs. John W. Newlin.

Mr. Sherman was elected an Associate Member of the Society on January 3, 1906; a Member on February 1, 1910; and a Fellow on June 6, 1959. He became a Life Member in 1914.

LLOYD BOWN SMITH, F. ASCE[44]

Died July 4, 1960

Lloyd Bown Smith, the son of Jacob Harrison and Sara Roana (Denham) Smith, was born near Paola, Kans., on November 25, 1869. He attended Kansas State Teachers College (Emporia) for two years, and was graduated from the University of Michigan (Ann Arbor) with the degree of Bachelor of Science in civil engineering in 1898.

He was employed briefly by the Paige Iron Works of Chicago and then by the Missouri Bridge Company of Leavenworth, Kans. In 1904 he became Chief Engineer of the Topeka (Kans.) Bridge Company. Mr. Smith served as Water Commissioner of the City of Topeka from 1935 until his retirement in 1955. Many of the public improvements in Topeka were developed under his guidance, including the present Topeka water system; the City Hall; the City Library; and Stormont-Vail Hospital. He also helped Topeka become the first city to receive federal aid for flood control. He was a leader in the promotion of flood control and water conservation projects on the tributaries of the Kansas River.

Mr. Smith was President of the Kansas Section of the Society in 1926; a member of the Kansas Engineering Society; the Topeka Engineers' Club; and was a registered engineer in Kansas.

He was married to Annette Hice on February 14, 1903, in Kansas City, Mo. She passed away in 1906, and he was married to Sarah Aller on August 24, 1915, in Baldwin, Kans. He is survived by his widow; two grandchildren; and six great-grandchildren.

He was elected an Associate Member of the Society on April 6, 1904; a Member on July 9, 1912; and a Fellow on June 6, 1959. He became a Life Member in 1939.

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[44] Abstract of a memoir prepared by Dale E. Dugan, M. ASCE.

RALPH WILLIAM STEWART, F. ASCE[45]

Died July 26, 1960

Ralph William Stewart, the son of John and Mary Gertrude (Hardenbergh) Stewart, was born near Barton, Wis., on March 24, 1878. He was graduated from the University of Wisconsin (Madison) in 1899 with the degree of Bachelor of Science in civil engineering.

After his graduation, Mr. Stewart was employed successively by the Chicago, Milwaukee and St. Paul Railroad; the Chicago and Western Indiana Railroad; and the Chicago and Alton Railway. In 1903 he became Assistant Engineer on the Sacramento Division of the Southern Pacific Railroad. In 1907 became Assistant Division Engineer of that railroad at Los Angeles, Calif. He was later Assistant Engineer with the City Engineer's Office of Los Angeles (1909 to 1911). In 1911 he was made head of the Bridge Design Division of the Los Angeles City Engineer's Office where he remained until his retirement in 1958. For ten years he served as Chief Deputy City Engineer at that office.

Mr. Stewart was a member of the Seismological Society of America; the Structural Engineers Association of Southern California; and the Society of Colonial Wars.

On October 14, 1909, he was married to Lucile Dixon in Los Angeles, Calif. He is survived by his widow; a son, Dixon; and a granddaughter.

Mr. Stewart was elected a Member of the Society on June 19, 1922, and a Fellow on June 6, 1959. He became a Life Member in 1949.

EDWARD HARPER THOMAS, M. ASCE[46]

Died December 31, 1958

Edward Harper Thomas, the son of Edward and Grace (Hayes) Thomas, was born in Seattle, Wash., on November 13, 1906. He was graduated from the University of Washington (Seattle) with the degree of Bachelor of Science in civil engineering in 1932, and the degree of Civil Engineer in 1944.

After graduation he joined the engineering staff of the Washington State Highway Department as Bridge Designer. From 1939 to 1945 he was employed by the Washington Toll Bridge Authority and had an active part in the design of the Lake Washington floating bridge as Office Engineer on construction. Afterwards, from 1945 to 1948, he served as Bridge Plans Engineer for the State of

45 Abstract of a memoir prepared by Merrill Butler, F. ASCE.
46 Abstract of a memoir prepared by Samuel DeMoss, F. ASCE.

Montana. Mr. Thomas was then engaged in consulting practice with Dexter Smith, and during this time, under a subcontract from Greiner and Company, prepared plans for the suspended span of the Chesapeake Bay Bridge, Maryland. In 1950 he rejoined the staff of the Washington Toll Bridge Authority as Supervising Bridge Engineer, advancing successively to Principal Bridge Engineer. His work involved the development of such major structures as the second Lake Washington floating bridge; the Hood Canal floating bridge; and the preliminary location and design of the proposed floating bridge across Puget Sound.

Mr. Thomas was a member of the Washington Society of Professional Engineers; the Audubon Society; and the Kitsap Historical Society.

On April 22, 1926, he was married to Betty James in Everett, Wash. He is survived by his widow; a brother; and three sisters.

Mr. Thomas was elected an Associate Member of the Society on May 18, 1943, and a Member on October 20, 1947.

GEORGE ROBERG THOMPSON, F. ASCE[47]

Died May 24, 1960

George Roberg Thompson, the son of Millard Fillmore and Susan Theresa (Roberg) Thompson, was born in Battle Creek, Mich., on September 1, 1885. He was graduated from the University of Cincinnati (Ohio) in 1907 with the degree of Civil Engineer.

He began his career as Inspector and Resident Engineer for the Detroit River Tunnel Company. From 1914 to 1920, Mr. Thompson was Superintendent of Construction for the Ford Motor Company, River Rouge Plant, and from 1921 to 1924 was Chief Building Inspector for the City of Detroit. He was then a Superintendent in the Detroit Department of Public Works from 1924 to 1927, and Budget Director for the State of Michigan from 1927 to 1937, except for a brief period in 1935 when he entered private practice. From 1937 to 1954 he was City Engineer of Detroit and from 1954 to 1960 was a member of the firm of Giffels and Rossetti, Architects and Engineers, Detroit.

Mr. Thompson was a former President of the Detroit Engineering Society and the Executive Committee of the Detroit Metropolitan Area Regional Planning Commission. He also belonged to the American Public Works Association; the Michigan Engineering Society; and the Prismatic Club.

On November 17, 1909, he was married to Myrtle Edith McClure in Detroit, Mich. He is survived by his widow; a daughter, Susellen Mary (Mrs. Claude Nemzek); two sons, Vincent McClure and James Peter; and ten grandchildren.

Mr. Thompson was elected a Member of the Society on December 13, 1937, and a Fellow on June 6, 1959.

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[47] Abstract of a memoir prepared by Austin J. Miller, M. ASCE.

MARVIN CORNELIUS TURNER, F. ASCE[48]

Died June 16, 1960

Marvin Cornelius Turner, the son of N. A. and Sara Belle (Anglin) Turner, was born in Austin, Tex., on April 11, 1906. He attended the University of Texas (Austin).

Mr. Turner started work with the Water Department of the city of Austin, in 1925 and worked with them until 1947. During this time he was Superintendent of the Water Department, Chief Design Engineer, and Superintendent of Water Distribution. From 1930 to 1932 and 1935 to 1936, he taught engineering mapping in evening classes to the employees of the City of Austin Water and Sewer Departments and the Texas Public Service Company. During a leave of absence he worked on the preparation of plans for Gergstrom Army Air Field, Abilene Army Air Field, and Prisoner of War Camps at Camp Hood and North Camp Hood, Tex. In 1947, Mr. Turner became a partner at Hoff and Turner Consulting Engineers doing municipal engineering work in Austin and central Texas.

Mr. Turner was a member of the National Society of Professional Engineers; the Austin Chamber of Commerce; and Sigma Phi Epsilon. He was a member of the AWWA and was a Trustee of its Southwest Section from 1941 to 1942; Vice-Chairman of the Section from 1944 to 1945; and Chairman from 1945 to 1946. He also belonged to the Federation of Sewage Works Association and to the Capitol Area Water and Sanitary Association in which he served as President in 1939, and Group Leader from 1940 to 1950. He was a licensed Land Surveyor and a Registered Professional Engineer in Texas. Mr. Turner was a Mason and a Shriner and belonged to St. Matthews Episcopal Church.

On June 16, 1935, Mr. Turner was married to Laurelle Hancock in Austin, Tex. He is survived by his widow; a daughter, Marla; and a son, Marvin, Jr.

Mr. Turner was elected a Member of the Society on July 29, 1955, and a Fellow on June 6, 1959.

WALTER WILLIAM TUTTLE, F. ASCE[49]

Died July 6, 1960

Walter William Tuttle, the son of Jay M. and Stella (Forrester) Tuttle, was born in Eagle River, Wis., on June 5, 1893. He was graduated from the Univer-

[48] Abstract of a memoir prepared by John A. Focht, F. ASCE.
[49] Abstract of a memoir prepared by Richard H. Cox, M. ASCE.

sity of Washington (Seattle) in 1916 with the degree of Bachelor of Science in electrical engineering.

He began his career as an Assistant Electrical Draftsman at the Puget Sound Navy Yard, Bremerton, Wash., in 1917. A year later he became an Electrical Draftsman in the Public Works Department at Pearl Harbor, Hawaii. He remained in the department until his death, at which time he was Director of the Design Division, District Public Works Office, 14th Naval District. In this capacity, he was responsible for the design and engineering of the Naval shore establishment in the 14th Naval District.

Mr. Tuttle was a member of the Society of Military Engineers and the Engineering Association of Hawaii.

On April 30, 1918, he was married to Dorothy Jesa Baker in Seattle, Wash. He is survived by his widow; four daughters, Virginia (Mrs. Westley Thomas), Cynthia (Mrs. Charles H. Sedam), Lani (Mrs. R. H. Arondale III), and Barbara (Mrs. Richard Rutsch); a son, Walter C.; a brother; and sixteen grandchildren.

Mr. Tuttle was elected a Member of the Society on April 8, 1957, and a Fellow on June 6, 1959.

EMIL FRANK VRANICH, A. M. ASCE[50]

Died June 11, 1960

Emil Frank Vranich, the son of Mike and Josephine (Szetlelich) Vranich, was born in Moran, Iowa, on March 5, 1924. He was graduated from the University of Michigan (Ann Arbor) with the degree of Bachelor of Science in civil engineering in 1948.

He began his career with L. J. Andrew, Inc., Fond du Lac, Wis., as Construction and Design Engineer, and was later associated with the Bureau of Bridges and Public Buildings, City of Milwaukee, Wis. For nine years, Mr. Vranich held various positions with a number of Milwaukee consulting firms, including that of Structural Engineer with Lefebvre-Wiggins and Associates, Engineers, and Mark F. Pfaller Associates, Architects; Chief Structural Engineer with Robert J. Strass, Inc.; and partner in the firm of Collings and Vranich. At the time of his death, he was President of Emil F. Vranich and Associates, Milwaukee.

Mr. Vranich held a reserve commission of Lieutenant in the Navy Civil Engineers Corps, and was a Registered Engineer in the states of Wisconsin; Minnesota; Kentucky; and North Dakota. He was a member of the American Society of Military Engineers and the American Concrete Institute.

On September 8, 1948, he was married to Shirley Surprenant in Cass City, Mich. He is survived by his widow; three sons, Thomas, James, and John; his parents; and two brothers.

Mr. Vranich was elected a Junior Member of the Society on September 7, 1948, and an Associate Member on June 6, 1959.

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[50] Abstract of a memoir prepared by Donald D. Roethig, M. ASCE.

FRANK WATKINS WEBSTER, F. ASCE[51]

Died October 20, 1959

Frank Watkins Webster, the son of Frank Watkins and Allie (Crockett) Webster, was born in Nashville, Tenn., on August 4, 1887. He was graduated from Vanderbilt University (Nashville) in 1908 with the degree of Bachelor of Engineering.

He began his professional career with the engineering departments of Tulsa and Oklahoma City, Okla. (1908 to 1913), and then was Assistant Engineer in the Jefferson County Engineering Office, Louisville, Ky. (1913 to 1917). From 1917 to 1920 Mr. Webster was Assistant Engineer for the Tennessee Highway Department and for the next nine years was the First Division Engineer for Division 1 (Knoxville, Tenn.). He was the first State Maintenance Engineer of Tennessee (1929 to 1933); State Highway Commissioner (1933 to 1934); and head Highway and Railroad Engineer of the Tennessee Valley Authority (1934 to 1957). From 1947 to 1953 he was a member of the City of Knoxville Planning Commission.

Mr. Webster held membership in the Knoxville Technical Society; Tau Beta Pi; and the Church Street Methodist Church in Knoxville.

On January 2, 1914, he was married to Cora Davis in Oklahoma City, Okla. He is survived by a son, Frank Watkins, Jr.; a daughter, Mrs. Lillian Webster Worth; two sisters; two brothers; and four grandchildren.

Mr. Webster was elected a Member of the Society on April 22, 1935, and a Fellow on June 6, 1959.

WILLIAM ROBERTSON WELTY, M. ASCE[52]

Died July 11, 1960

William Robertson Welty, the son of Perry Allen and Alice Lavenia (Thayer) Welty, was born in San Francisco, Calif., on April 11, 1912. He attended the University of Texas (Austin) from 1929 to 1933, and was graduated in 1943 with the degree of Bachelor of Science in civil engineering.

From 1933 to 1941 he was employed by the Petty Geophysical Engineering Company, San Antonio, Tex., and was first assigned to seismic field parties. In 1938 he conducted research on seismic computation methods for petroleum

51 Abstract of a memoir prepared by Jack W. Hind, M. ASCE, and Hugo Colditz, M. ASCE.

52 Abstract of a memoir prepared by John A. Focht, F. ASCE.

exploration and in 1939 was assigned to a study of patents, developing several of his own. Mr. Welty then worked as Draftsman, Checker, and Bridge Designer for the Bridge Division of the Texas Highway Department (1941 to 1945). In 1945 he received an Automotive Safety Foundation Fellowship at Yale University and in 1946 returned to the Traffic Engineering Section of the Texas Highway Department where he remained until his death. While with that department he developed their current accident and coding system.

Mr. Welty was President of the Austin Branch of the Texas Section of the Society; a member of the Institute of Traffic Engineers; the Engineers and Associates Club of Austin; and the Austin Heart Fund Association.

He was married to Emily St. Pierre Hutson in Austin, Tex., on November 10, 1956. He is survived by his widow.

Mr. Welty was elected a Junior Member of the Society on March 12, 1945; an Associate Member on July 21, 1947; and a Member on June 6, 1959.

GEORGE DAVIS WILLIAMS, A. M. ASCE[53]

Died October 14, 1958

George Davis Williams, the son of George and Fanny (Davis) Williams, was born in Denton, Tex., on June 14, 1903. He was graduated from the Agricultural and Mechanical College of Texas (College Station) in 1926 with the degree of Bachelor of Science in civil engineering and recieved the degree of Master of Science in civil engineering in 1929.

Before receiving his Master's Degree, Mr. Williams worked with the paving departments of Fort Worth and Beaumont, Tex., and with the Pittsburgh Testing Laboratories. He resumed his position with the City of Beaumont in 1929. In 1933 he joined the Texas Highway Department where he was appointed Resident Engineer in Beaumont and, in 1939, Assistant Construction Engineer in Austin, Tex. In 1942 he became a Construction Engineer on the construction of Airports at Austin, Galveston, and Victoria, Tex. In 1944, with Julian Montgomery, he opened a general consulting office that specialized in municipal problems; C. G. Levander joined the firm in 1957.

Mr. Williams was a member of the Board of Deacons of the University Presbyterian Church. He was also a member of the American Water Works Association; the American Planning and Civic Associations; and the Texas and National Societies of Professional Engineers.

He was married to Minnie Allen Hardin in 1929, in Beaumont, Tex. He is survived by his widow and a son, Dave H.

Mr. Williams was elected a Junior Member of the Society on January 13, 1930, and an Associate Member on May 13, 1935.

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53 Abstract of a memoir prepared by John A. Focht, F. ASCE.

TRANSACTIONS

OF THE

AMERICAN SOCIETY OF CIVIL ENGINEERS

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1961

INTRODUCTION

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